



mineral resources

Department:

Mineral Resources

REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT and ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED)

NAME OF APPLICANT: MYSTIC PEARL 157 (PTY) LTD

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FILE REFERENCE NUMBER SAMRAD: (NC) 30/5/1/1/2/11750 PR

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1)(c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is therefore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts—
 - (aa) can be reserved;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be avoided, managed or mitigated.
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

PART A**SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT****3. Contact Person and Correspondence Address****a) Details of****i) Details of the EAP**

Name of the Practitioner:	ROELINA OOSTHUIZEN
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ii) Expertise of the EAP**(1) The qualifications of the EAP**

Masters in Environmental Management (UFS)
 B-Comm in Human and Industrial- Psychology (NWU)
 (With evidence attached as **Appendix 1**)

(2) Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure)

Relevant past experiences in carrying out the Environmental Impact Assessment Procedures include Environmental Impact Assessments, Environmental Management Plans/Programmes/ Reports, Performance assessments, Rehabilitation progress assessments, Environmental Liability assessments, Environmental compliance monitoring, Scoping Reports, etc.

Please refer to attached CV.

(with evidence attached as **Appendix 2**)

b) Description of the property

Farm Name:	A Portion of Portion 1 of the Farm Vooruitzicht 81, Kimberley District Province: Northern Cape Title Deed No.: T4349/2001
Application area (Ha):	253.6919 ha (two five three hundred comma six nine one nine hectares)
Magisterial district:	Kimberley
Distance and direction from nearest town:	The Vooruitzicht farm is situated in the Kimberley District and lies about 2.5km west of Kimberley on the outskirts of the city. The site is located immediately west of Kimberley at the intersection of the N8 and R31 routes in the Northern Cape Province.
21 digit Surveyor General Code for each farm portion:	C037000000000081000001

- c) **Locality map** (show nearest town, scale not smaller than 1:250000)



Figure 1. The location of the Mystic Pearl prospecting area is indicated in purple with Kimberley town clearly showing on the google map.

d) Description of the scope of the proposed overall activity

(provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site)

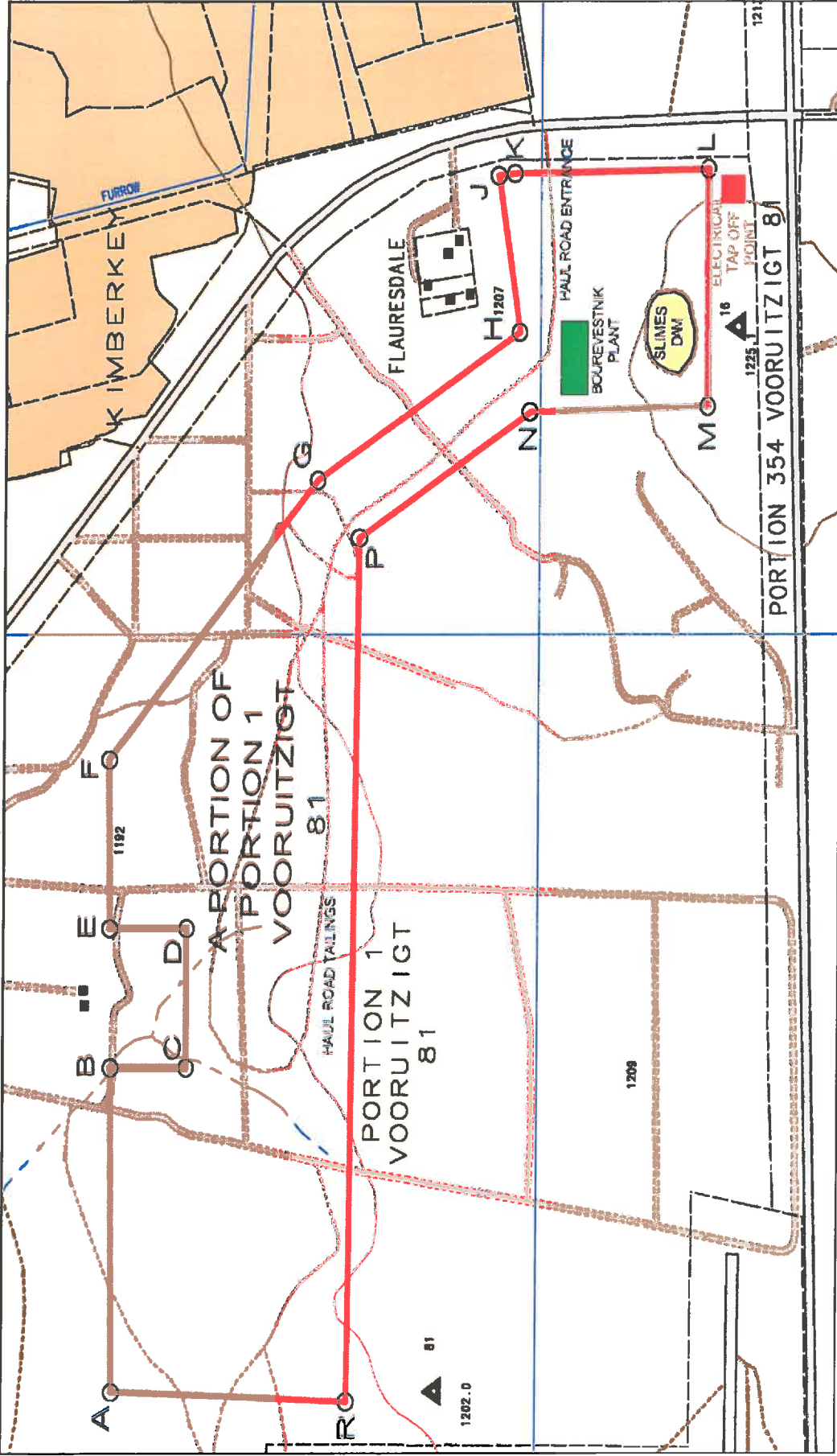


Figure 2. A map of the area indicating the overall location and extent of listed activities and main infrastructure on the prospecting site not to scale

i) Listed and specified activities

Table 1: Listed and Specified Activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)/NOT LISTED
<p>e.g. for prospecting – drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route, etc...etc...etc.</p> <p>e.g. for mining – excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.</p>			
<p>Any activity including the operations of that activity which requires a prospecting right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of Section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) Activity 20 of Listing Notice 1</p> <p>The removal and disposal of minerals contemplated in terms of Section 20 of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of Section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) Activity 19 of Listing Notice 2</p>	<p>253.6919 ha</p>	<p>X</p>	<p>GNR 893</p>
	<p>253.6919 ha</p>	<p>X</p>	<p>GNR 984</p>

<p>Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case Activity 6 of this Notice applies. Activity 21 of Listing Notice 2</p>	0.15 ha	X	GNR 984
<p>Activity 24(ii) of NEMA Listing Notice 1 The development of haul roads 15m wide with no reserve</p>	±1.5 ha on the Area.	X	GNR983
<p>Activity 56(ii) of NEMA Listing Notice 1 The continuous lengthening (and rehabilitation) of haul roads 15m wide with no reserve</p>	±1.5ha on the Area.	X	GNR983
<p>Activity 27 of NEMA Listing Notice 1 The clearance of an area of 1 hectare or more, but less than 20 ha of indigenous vegetation</p>	A total of 0.5 hectares for the trenches and 5ha for other infrastructure will be physically disturbed were the alluvial diamond material will be removed and washed.	X	GNR984
<p>Activity 9 of Category A under the National Environmental Management: Waste Act 59 of 2008 A Mine Residue Dam</p>	The disposal of inert waste of 10 000 tons or 1ha, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by other		GNR 633

	legislation. 1ha		
<p>Activity 15 of Category A under the National Environmental Management: Waste Act 59 of 2008 The continuous establishment and reclamation of temporary stockpiles resulting from activities which require a Prospecting Right.</p>	0.04ha		GNR 633
<p>OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities)</p> <p>Temporary Workshop Facilities Storage Facilities Concrete Bund walls and diesel Depots Ablution Facilities Topsoil Stockpiles Overburden Stockpiles 2X Park Homes</p>	<p>±300m² ±3000m² ±150m² ±25m² ±2 000m² ±2 000m² 0.075ha</p>		NOT LISTED
A water pipeline of unknown length but less than 1000m	1000m		Not Listed

ii) **Description of the activities to be undertaken**

(Describe methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

Description of the Planned Prospecting Methods to be implemented

1) **Description of Planned Non-Invasive Activities**

(These activities do not disturb the land where prospecting will take place e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.)

Phase 1

Imagery Analysis and Geological Mapping

High resolution satellite images will be studied and used to geologically map the application area. Contacts between various lithologies will be mapped and specific attention will be given to delineate and define areas underlain by alluvial gravels or Kimberlites.

A site investigation of the target areas will be undertaken to identify infrastructure and determine any potential problems that may need to be addressed.

2) **Description of Planned Invasive Activities**

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

Phase 2

Invasive Prospecting Trenches

Invasive prospecting trenches will be positioned in the region of the blue blocks and each block represents 5 trenches as indicated in Fig. 3.



Figure 3: Each blue block represents five trenches, this is not on scale

Trenches Sampling

Discussed hereinafter in Section 4.

3) Description of Pre-feasibility Studies

(Activities in this section includes but are not limited to: initial, geological modelling, resource determination, possible future funding models, etc.)

Phase 3**Analytical Desktop Study**

The project Geologist monitors the programme, consolidates and processes the data and amends the programme depending on the results. This is a continuous process throughout the programme and continues even when no prospecting is done on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the manner in which the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

A GIS based database will be constructed captured all exploration data.

4) Description of Bulk Sampling Activities

(Bulk sampling is a sampling technique only)

Volumes of the mineral to be tested

50 Trenches will be excavated with the following dimensions that prove to contain gravels. It is estimated that an average 3m of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2 – 4m) which is host to the diamonds. The trenches will be 25m x 15m x 0.5 – 7m deep. We calculated the volume of gravel on 2m and if all 50 trenches are going to be excavated an average of 37 500m³ will be tested.

Why will they be tested:

The gravel will be tested to determine a grade (carats per hundred tonne) and value (US\$ per carat). The closest alluvial operation is next to this farm on Platfontein which necessitates bulk sampling for this project.

Where will they be tested:

All bulk sampling activities will take place on site. Herewith follows a description of the process:-

The planned bulk sampling technique is that of a typical South African alluvial diamond operation. The planned prospecting method is a strip mining process with oversize material from the gravel scalping and the tailings from the plant, being used as a

backfill material prior to final rehabilitation. Gravels are excavated, loaded and transported to the nearby treatment facility using articulated dump trucks.

The access to the various gravel trenches will be provided by a haul road to the screening and processing plants. The operation is to be conducted using conventional open pit mining equipment comprising two 40-t articulated dump trucks supported by appropriate 60-t and 40-t excavators and a front-end loader.

The vegetated soil overlying the planned trenches is stripped prior to excavation of the gravel and stockpiled on a dedicated dump to be used for rehabilitation purposes at a later stage.

The gravel is loaded with a 60-t excavator into ADT's. Ore is hauled to the screening plant. As an integral part of the bulk sampling processes, backfilling will take place continuously.

The operation is to be conducted using conventional open pit mining equipment:

Earthmoving and ancillary equipment

1 x Excavator

1 x Front-end Loader

2 x Articulated Dump Trucks

1 x Water Truck

1 x 16ft-Rotary Pan

Screen

Utility vehicles and small tools

Diamond recovery unit with Flowsort Machines, Plant, and recovery, crushing and screening equipment

Gravels are loaded onto a vibrating grizzly and the +85mm oversize material is discarded back into the open pit (about 25% reduction). The remaining -85mm fraction is loaded into a 16-foot rotary pan with a treatment capacity of 50 tph. A magnetic separator is used to extract some of the heavy banded iron stones. Tracer tests are done regularly to ensure that the pan is operating at the correct density. Approximately 2.5 tonne of concentrate is tapped from the pan every hour and transported in locked containers to the final recovery unit.

The final recovery unit consists of a holding bin, sizing screen, sizing bins and one state of the art Flowsort X-ray recovery unit which recover diamonds from the +2mm to -32mm size fraction. Final sorting of the X-ray concentrate will be done manually.

Rehabilitation will take place continuously and at any stage only one trench will be open.

To whom they will be disposed of:

At an expected grade of 0.5 carats per hundred tonnes, 8 800 carats could be recovered from the gravels. Diamonds will be sold at a reputable diamond tender house in Kimberley to determine an average US\$ carat value for the diamonds.

Waste Management

Proper sanitation facilities will be provided for employees. No person will pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine. Acceptable hygienic and aesthetic practices will be adhered to. Non-biodegradable refuse such as glass bottles, plastic bags, etc. will be sorted and stored in separate lockable containers at a central point. It will be disposed of at a recognised disposal facility twice a month. Biodegradable refuse will either be handled as indicated, or be buried in a pit excavated for that purpose and covered with layers of soil when almost full. A final 0,5m thick layer of topsoil will be incorporated where practicable. Provision will be made for the future subsidence of the covering. Refuse will not be dumped in the vicinity of the mining area. Waste material with regard to vehicle repairs will be kept in 200 litres steel containers in the maintenance/farmstead area. This material will be disposed of at a recognised disposal facility once a month.

Table 2: Bulk Sampling Activities

ACTIVITY		DETAILS		
Number of pits/trenches planned		50 trenches		
	Number of pits/trenches	Length	Breadth	Depth
	50	25m	15m	0.7m
		18 750m ² = 1.875ha that will be disturbed with trenches (0.7% of the property will be tested and disturbed)		
Locality		See figure 3 above		
Volume Overburden (Waste)		43 706.25		
Volume Ore		37 500 (estimated 2m gravel)		
Density Overburden		1.6		
Density Ore		1.78		
Phase when bulk sampling will be required		Phase 3		
Timeframe(s)		From time-to-time during months 7 to 30		

e) Policy and Legislative Context

Applicable Legislation and Guidelines used to compile the report <small>(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</small>	Reference where applied	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use License has/has not been applied for).
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	<ul style="list-style-type: none"> - Section 5: Implementation of control measures for alien and invasive plant species; - Section 6: Control measures. - Regulation GN R1048, published on 25 May 1984, in terms of CARA 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	<ul style="list-style-type: none"> - Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	<ul style="list-style-type: none"> - Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions. 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	<ul style="list-style-type: none"> - Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	<ul style="list-style-type: none"> - Definition, classification, use, operation, modification, disposal or dumping of hazardous substances. 	<ul style="list-style-type: none"> - Noted and Considered measures are to be implemented upon the approval of the EMPR.
Intergovernmental Relations Act (Act 13 of 2005)	<ul style="list-style-type: none"> - This Act establishes a framework for the National, Provincial and Local Governments to promote and 	

Mine, Health and Safety Act (Act 29 of 1996) and Regulations	facilitate intergovernmental relations. - Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Prospecting Right has been applied for Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	<ul style="list-style-type: none"> - Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal) - Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision) 	<ul style="list-style-type: none"> - The proposed prospecting site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. The Vooruitzicht project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area under survey is described as Kimberley Thornveld complex which occurs across three provinces (Northern Cape, Free State and North West) at altitudes between 1 050 to 1 400 m. - This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present. Control measures are to be implemented upon the approval of

<p>National Environmental Management: Air Quality Act (Act 39 of 2004)</p>	<ul style="list-style-type: none"> - Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM:AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines) 	<p>the EMPR.</p> <ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMR and is to be adhered to.
<p>National Environmental Management: Biodiversity Act (Act 10 of 2004)</p>	<ul style="list-style-type: none"> - Section 52 of The National Environmental Management Act: Biodiversity Act (NEMBA) (Act 10 of 2004) states that the MEC/Minister is to list ecosystems that are threatened and in need of protection. - Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - A list of threatened and protected species has been published in terms of Section 56(1) GG 29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations. - Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007 GNR 150/GG 29657/23-02-2007 - Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * 	<ul style="list-style-type: none"> - A permit application regarding protected plant species need to be lodged with DENC if any protected species need to be removed? - The proposed prospecting site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. The Vooruitzigt project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area under survey is described as Kimberley Thornveld complex

<p>The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa's natural biodiversity and its landscapes and seascapes.</p>	<p>Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 *</p> <ul style="list-style-type: none"> - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. - Regulation GN R151, published on 23 February 2007 (List fo Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species) - Chapter 2 lists all protected areas. 	<p>which occurs across three provinces (Northern Cape, Free State and North West) at altitudes between 1 050 to 1 400 m (taken out of the Ecological study). This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present. Control measures are to be implemented upon the approval of the EMPR.</p>
<p>The proposed prospecting site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. The Vooruitzigt project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area</p>		<p>The proposed prospecting site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. The Vooruitzigt project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area</p>

National Environmental Management: Waste Management Act (Act 59 of 2008)	<ul style="list-style-type: none"> - Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921) 	<p>under survey is described as Kimberley Thornveld complex which occurs across three provinces (Northern Cape, Free State and North West) at altitudes between 1 050 to 1 400 m.</p> <ul style="list-style-type: none"> - This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present.
National Forest Act (Act 84 of 1998)	<ul style="list-style-type: none"> - Section 15: No person may cut, disturb, damage, 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
		<ul style="list-style-type: none"> - A permit application regarding

<p>and Regulations</p>	<p>destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.</p>	<ul style="list-style-type: none"> - protected plant species need to be lodged with DENC if any protected species is encountered. - The proposed prospecting site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. The Vooruitzicht project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area under survey is described as Kimberley Thornveld complex which occurs across three provinces (Northern Cape, Free State and North West) at altitudes between 1 050 to 1 400 m. - This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present. - Control measures are to be implemented upon the approval of the EMPR. - Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure is
<p>National Heritage Resources Act (Act 25 of 1999) and Regulations</p>	<ul style="list-style-type: none"> - Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant 	<ul style="list-style-type: none"> - This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present. - Control measures are to be implemented upon the approval of the EMPR. - Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure is

	<p>provincial heritage resources authority.</p> <ul style="list-style-type: none"> - Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority. - Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process. - Regulation GN R548 published on 2 June 2000 in terms of NHRA 	<p>attached to the PIA.</p> <ul style="list-style-type: none"> - The specialist phase 1 HIA and PIA studies indicated no heritage or paleontological finds.
<p>National Water Act (Act 36 of 1998) and regulations as amended, <i>inter alia</i> Government Notice No. 704 of 1999</p>	<ul style="list-style-type: none"> - Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses <p>In terms of Section 21 a licence is required for:</p> <ul style="list-style-type: none"> (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may 	<ul style="list-style-type: none"> - A water use application is in the final stages of preparation and will be lodged with Department of Water and Sanitation (DWS) when the EIA EMP has been finalized. - Control measures are to be implemented upon the approval of the EMPR.

	<p>detrimentally impact on a water resource;</p> <p>(i) altering the bed, banks, course or characteristics of a watercourse;</p> <p>(i) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and;</p> <ul style="list-style-type: none"> - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j)) 	
Nature Conservation Ordinance (Ord 19 of 1974)	<ul style="list-style-type: none"> - Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.

<p>Northern Cape Nature Conservation Act (Act 9 of 2009)</p>	<p>Flora.</p> <ul style="list-style-type: none"> - Addresses protected species in the Northern Cape and the permit application process related thereto. 	<ul style="list-style-type: none"> - A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered. - The proposed prospecting site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. The Voortuizigt project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area under survey is described as Kimberley Thornveld complex which occurs across three provinces (Northern Cape, Free State and North West) at altitudes between 1050 to 1400 m. - This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present. - Control measures are to be implemented upon the approval of the EMPR.
<p>Occupational Health and Safety Act</p>	<ul style="list-style-type: none"> - Section 8: General duties of employers to their 	<ul style="list-style-type: none"> - Control measures are to be

(Act 85 of 1993) and Regulations	employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees. - Entire Act.	implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	-	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)	-	- To take note.
Northern Cape Planning and Development Act (Act 7 of 1998)	- To control planning and development	- To be implemented upon the approval of the EMPR.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	- To provide a framework for spatial planning and land use management in the Republic; - To specify the relationship between the spatial planning and the land use management, amongst others - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's	- To take note.
Development Facilitation (GNR1,	- Regulations re application rules S26, S46, S59	- To take note.

GG20775, 07/01/2000)			
Development Facilitation (GN732, GG14765, 30/04/2004)	-	Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997) and regulations, more specifically GN R1130	-	To control land surveying, beacons etc. and the like; - Agriculture, land survey S10	- To take note.
National Veld and Forest Fire Act (Act 101 of 1998) and regulations, more specifically GN R1775	-	To regulate law on veld and forest fires (Draft regulations s21)	- To be implemented upon approval of the EMPR
Municipal Ordinance, 20/1974	-	To control pollution, sewers etc.	- To be implemented upon approval of the EMPR
Municipal Ordinance, PN955, 29/08/1975	-	Nature conservation Regulations	- To be implemented upon approval of the EMPR
Cape Land Use Planning Ordinance, 15/85	-	To control land use planning	- To take note.
Cape Land Use Planning Ordinance, PN1050, 05/12/1988	-	Land use planning Regulations	- To take note.

f) Need and desirability of the proposed activities

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location)

The farm portion over which the application was applied for is currently utilized for limited grazing but is earmarked for development by the council. The applicant has applied in 2013 already to obtain this area by the Council to apply for this area. Only a small portion of the area will be impacted on ($\pm 18750\text{m}^2 = 1.875\text{ha}$ that will be disturbed with Trenches (0.7% of the property will be tested and disturbed) at any given time with bulk sampling which represents the footprints of all the trenching activities on the farm combined) the rest of the areas can proceed normally.

There are two market types for diamonds namely jewellery and industrial.

A competitive market for diamonds exists internationally and locally and these reserves constitute an economically viable resource with the potential of earning foreign currency and supplying work opportunities in an area of great unemployment.

Summary of product consumers

The diamond industry is an international trade and one that involves a number of processes between the mining and extraction of the rough product through to the polished diamond jewellery of the retail sector. Commonly referred to as the pipeline put simply this consists of the mining wholesale dealing, manufacturing, polished wholesale, jewellery manufacturing and the retail sector. Increasingly such segmentation according to process for this pipeline is becoming more blurred as downstream and upstream movements take place. World rough diamond production is estimated to be some \$8 billion per annum of which South Africa is the fourth biggest producing country.

Summary of customer specifications and details of any proposed beneficiation of the products

The diamond production should be ideally suited for the jewellery market. It is hoped that at least some of the diamond production will be cut and polished locally.

Summary of infrastructure requirements such as roads, rail, electricity and water

The city of Kimberley is the capital of the Northern Cape Province, South Africa and can be reached via a tarred road. Kimberley can be described as the diamond capital of South Africa with a history of diamond mining since the discovery of diamonds in 1871 that led to the creation of the Big Hole. Today, a large number of diamond mines are operational in the area, including the Finch Diamond Mine of De Beers.

Infrastructure in the area is well developed with good road and rail networks, electricity grid and water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale diamond mining. Water for processing plant will be sourced from the Municipality if the bulk sampling stage is reached.

Summary of other information applied that may influence price, e.g. exchange rate, duties, tariff barriers, etc.

- a) Exchange rate – direct influence on revenue as the product price is determined in US dollars
- b) Fluctuations in diamond market demand and supply may also influence prices in the market.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

Taking into consideration all the information captured in this report, the most appropriate procedure for planning and developing the proposed prospecting operation will involve the following:

(a) Prospecting Method

The location of the prospecting is determined by the geological location of the possible mineral resource. This site is located within the alluvial, Kimberlite diamond areas. Prospecting with non-invasive and invasive methods should it prove positive with the understanding that the formulation of an effective Environmental Management Programme and the implementation thereof, as well as the obtainment of an authorisation for the abstraction of water from a resource for bulk sampling purposes from the Department of Water and Sanitation in terms of the National Water Act, 1998 (Act No. 36 of 1998, is an inseparable part of the proposed operation.

(b) Labour Force

Employing people who originate from within the boundaries of the application area's Municipality. This will guarantee benefits such as a positive contribution to the local economy; a decrease in local unemployment figures; a decrease in the social phenomena normally associated with unemployment, such as crime and alcohol abuse; and a positive contribution to cultural cohabitation.

(c) Rehabilitation

Making financial provision for the implementation of a rehabilitation strategy as is required by Section 41 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

(d) Environmental Monitoring

Carrying out environmental monitoring on a regular basis, as is required by Regulation 55 of the Regulations published in Government Notice No. 26275 under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) and in the NEMA regulations published 20 November 2015, Appendix 3.

(e) General

Being open to possible comments, suggestions and complaints received from neighbouring communities or members of the general public that might result from the implementation of the proposed prospecting operation.

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Figure 2 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

(a) The property on which or location where it is proposed to undertake the activity:

- (a) The registered description of the land to which the Prospecting Right application relates:

Farm Name	Title Deed	In Extent
A Portion of Portion 1 of the Farm Vooruitzicht 81, Kimberley District Province: Northern Cape	T4349/2001	253.6919 ha (two five three hundred comma six nine one nine hectares)

Alternatives considered:-

As the area covered under the Prospecting Right had been selected based on the assumption of diamonds and indication of the presence of diamonds, it will not be viable to consider an alternative site for the prospecting. Alternatives for land are thus not available, as the Prospecting Right application cannot be considered over another area.

Therefore there are no alternatives to the area.

(b) The type of activity to be undertaken:

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. The various alternatives were assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality the prospecting operation do not form part of the discussion as the location of the mine is determined by the geological location of the mineral resource (as discussed in section f).

Land Use

The area is undeveloped but previously disturbed by large-scale and un-rehabilitated mining activities (particularly in the south-eastern areas of the proposed area), public fly-tipping and illegal waste dumping as well as poaching, firewood collection and illegal grazing activities by local adjacent communities. There are no fully maintained fencing structures or excluded areas currently. (ECOLOGICAL SPECIALIST STUDY FOR THE PROPOSED MYSTIC PEARL 157 (PTY) LTD DIAMOND MINE PROJECT ON PORTION 1 OF FARM VOORUITZIGT 81 & CONCURRENT DEVELOPMENT OF OTTO'S KOPJE DIAMOND MINE, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE, August 2017 by Beryl Wilson).

The prospectors will have to promote rehabilitation strategies to ensure that open pits are backfilled. There will be infield screening to ensure that all oversize material is deposited back into the pits. This material should be covered with the overburden (where available), and topsoil that has been previously put aside for this purpose. The post-mining land use should be determined so that the developments strategies of the farm can still be continue beyond the prospecting and mining of the area should the area be viable for mining.

Project Infrastructure

Alternatives and considerations pertaining to the project infrastructure were discussed in section g.

Prospecting Method

The Prospecting method of open pits with continued backfilling is the only economic viable method currently being used by the diamond fraternity. There is no alternative prospecting method for the prospecting of diamonds.

Proceed without the Mine (no go)

Land Use

The current land use is limited grazing and plans for the development of the area by the council. If the prospecting operation does not continue, the limited grazing capacity and plans for development will continue. Municipal water will be obtained for bulk sampling. The prospecting operation will not abstract any ground water.

Socio-Economy

The Mystic Pearl prospecting plan is to employ 15 people. The non-approval if this prospecting operation would impact negatively on the employment rate for Kimberley and the families who are likely to benefit from the positive employment opportunities. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity

The implementation of the Mystic Pearl prospecting will have a potential impact on the biodiversity through removal of indigenous vegetation and destruction of habitats. If no prospecting activities were to continue, the status quo would apply and no damage would accrue to the environment.

Heritage and Cultural Resources

Findings of the HIA survey

A western portion of the property bears scars of excavations of varying depths which are ongoing in some areas. From an archaeological standpoint, the area is considered as disturbed and no archaeological provenances pre-dating the city can be expected to have survived the impact of these activities. Furthermore there are no elements of heritage value relating to the development of the city.

With respect to the eastern portion of the property close to the intersection of the N8 and R31, and located opposite to a section of Galeshewe Township, no archaeological relics were found. The only sign of human activity is degraded vegetation and pedestrian pathways to the farms and dumping site located to the west and northwest of the property.

Two mounds (Sites P9 & P10) which form the eastern ends of parallel ridges appear to be a mixture of household refuse and/or industrial discard perhaps dating back more than 60 years. Although the rating for heritage value is low, material / artefacts found therein might be of relevance in the fields of historical archaeology / industrial archaeology. However these two disciplines have not yet been formally introduced in universities or heritage museums in the country. The mounds therefore do not warrant protection in terms of this impact evaluation, suffice it to mention an opportunity that can be pursued in the future. PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE, May 2017 by Edward Matenga (MPhil, Archaeology; PhD Archaeology & Heritage, Uppsala/Sweden))

In the event that the prospecting operation does not proceed, the heritage resources will remain as is. The protection and preservation of these resources are therefore not guaranteed. However, if the prospecting operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off if any of these resources are encountered.

Findings of the Palaeontology study

The proposed activity entails excavating 50 test trenches. It is estimated that an average 3m depth of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2 – 4m) which is host to the diamonds. The trenches will be 25m x 15m x 0.5 – 7m deep. A palaeontological assessment is necessary as these superficial levels might contain fossils in view of the known palaeontological sensitivity of the area.

The rock units underlying the area of the proposed development have been identified from the 1: 250 000 geology map 2824 Kimberley (Council for Geosciences, Pretoria), scientific literature and previous palaeontological impact assessments that have been conducted in the broader area. The following is a summary of the findings:

The Allanridge Formation andesite lavas belong to the Ventersdorp Supergroup (VSG) which date back to the Precambrian 2600 MYA. The Ventersdorp Supergroup represents a major episode of igneous extrusion, what is termed a Large Igneous Province (LIP) from below the Kaapvaal Craton some 2.7 Ga (billion years) ago. The Allanridge Formation of igneous lavas are considered to be unfossiliferous.

The Dwyka Group forms the lowermost and oldest deposit in the Karoo Supergroup basin. Northwest of Kimberley the rocks in this group exhibit glacial pavements - glacially-striated and eroded bedrocks – of Permo-Carboniferous age, (c. 300 Ma) that tend to overlie the Allanridge Formation outcrop area in the same region. The Dwyka tillite is mostly a very fine-grained, blue-grey rock comprised of clay / mud matrix with inclusions (or clasts) of many other fragments picked up by glaciers during their travels. The paleontological rating of the glacial tillites of the Dwyka Group are considered to be medium to low.

The Eccia group is a subcomponent of the Karoo Supergroup, a sedimentary complex post-dating Dwyka in which principally shales and sandstones were laid down in the sandy shorelines of swamplands during the Permian Period. The Eccia fossil marine deposition may contain marine invertebrates (esp. molluscs, brachiopods), coprolites, palaeoniscoid fish & sharks. There are also traces fossils, various microfossils, petrified wood. The palaeontological rating according to Almond (2012) is high.

The Karoo dolerite of the Drakensberg Group sill underlies most of the area in the Kimberley municipal area. It represents an intrusion of igneous lavas between 183.0 to 182.3 MYA. Dwyka shales lying immediately below the dolerite sheet have usually been metamorphosed to lydianite and hornstone as a result of exposure to intense heat during the intrusion event, with a possibility of destroying fossil materials in the upper layers of these sediments. The Karoo dolerite (igneous lavas) are considered to be unfossiliferous.

Large areas of unconsolidated, reddish-brown to grey aeolian (i.e. wind-blown) sands of the Quaternary Gordonia Formation (Kalahari Group) have been observed on the western outskirts of Kimberley and at the Farm Vooruitzigt 81 and Fieldsvue north of the city. Immediately below the sands may be a calcretic layer or pedogenic limestones generally considered of the same geological period. They are considered of low sensitivity with the possibility of finding calcretised rhizoliths & termitaria, ostrich egg shells, land snail shells, rare mammalian and reptile (e.g. tortoise) bones, teeth freshwater units associated with diatoms, molluscs, stromatolites etc.

Although the impact of the proposed development on fossil resources is expected to be minimal, it is still recommended that the Environmental Control Officer (Eco) put in place a contingency plan to rescue chance finds and where possible preserve

them in situ. A standard Fossil Finds Procedure (FFP) is appended to this report to provide field guidance to the ECO. The recommendations made here should also be incorporated into the Environmental Management Plan for the proposed mining operations. (PALAEOLOGICAL SPECIALIST ASSESSMENT (DESKTOP) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE May 2017 Prepared by Joseph Chikumbirike (PhD Palaeontology, University of the Witwatersrand)).

(c) The design or layout of the activity:

The site infrastructure will need to be strategically placed by incorporating prospecting project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the nearby access roads, proximity to the areas earmarked for bulk sampling as well as limited additional impact on the environmental (non-perennial drainage lines and wind direction), heritage resources and discussions with the relevant Departments.

The following infrastructure will be established and will be associated with the mining operation:

- Processing Plant: 1 X 16 feet
- Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
- Clean & Dirty water system: Berms
It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the prospecting site.
- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
It is anticipated that the operation will utilize 1 x 23 000 litre diesel tank. This tank must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tank. A concrete floor must be established where the re-fuelling will take place.
- Prospecting Area: Area applied for to trench for diamonds (bulk sampling).
- Processing plant:
- Roads (both access and haulage road on the mine site):
Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 2 km of roads, with a width of 5 meters. The current access road is deemed adequate for a service road into the mine.
- Salvage yard (Storage and laydown area).
- Product Stockpile area.

- Waste disposal site
The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:
 - Small amounts of low level hazardous waste in suitable receptacles;
 - Domestic waste;
 - Industrial waste.
- Temporary Workshop Facilities and Wash bay.
- Water distribution Pipeline.
- Water tank:
It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

Alternatives considered:-

Alternatives for fuel storage include surface storage, underground storage and the storage of fuel in mobile tanks with a metal bund wall. Underground storage has an adverse negative pollution potential, because it is not easy to monitor leakages. Remediation measures are also not as effective as compared to surface storage tanks. Mobile tanks are a viable option for infield screening activities, but the best viable long term option is the instalment of fuel tanks within a concrete bund wall. The final location of the fuel storage tanks will be determined based on proximity to site operations.

In terms of water use alternatives; the operation is not located near any perennial rivers but are within Kimberley and can make use of Municipal alternatives as the best water source for the operation. Plastic pipelines are considered to be the best long term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

Therefore, a pipeline route will be designed based on the principle of minimum impacts to the environment.

In terms of power generation the options available was for Generators or ESKOM power. All of the electricity needs for the operations will be generated by a diesel generator and there would therefore be no additional pressure on the Eskom Electricity Grid.

In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.

(d) The technology to be used in the activity:

- Technique

The area will be excavated (opencast method) with an excavator up to bedrock, stockpiled next to an open area and loaded onto the trucks by a frond end loader. The trucks will transport the gravel via a newly constructed road, which will be constructed to the required safety standard. No provincial roads will be used. At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening and crushing section for delivery to a recovery plant and associated equipment.

- Technology

At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening and crushing section for delivery to a recovery plant and associated equipment.

Alternatives considered:-

The planned prospecting activities include (bulk sampling) with an excavator up to bedrock. The operation is also associated with processing techniques that make use of modern technologies. These are the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative prospecting method for the bulk sampling of possible alluvial and kimberlite diamonds.

(e) The operational aspects of the activity:

The gravels will be loaded with an excavator on to dump trucks for conveyance to the Processing Plant. At the Processing Plant the bulk sample gravels will be fed onto a grizzly for screening out oversize material. The tailings will be processed through a screening and crushing section for delivery to a recovery plant. Concentrate from the recovery plant will be processed through an X-Ray/Sortex plant to extract possible diamonds.

Prospecting activities will primarily make use of existing roads, but additional roads will most likely be created.

Alternatives considered:-

The conventional opencast load-haul-bulk sampling method has been proven to be the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative bulk sampling method for the prospecting and extraction of possible kimberlite and alluvial diamonds.

(f) The option of not implementing the activity:

Potential land use includes grazing and prospecting. The majority of the area is classified to have low potential for grazing land and no suitability for crop yield. Therefore, prospecting activities are believed to be the most economically beneficial option for the area to establish any potential for mineral resources, before development later by the council.

Socio-Economy

The operation will make provision for 15 job opportunities. This will be lost if the project does not proceed. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity

Areas larger than 10 hectares are considered to have significant environmental footprint impacts, particularly regarding changes in landforms, drainage patterns, dust generation and conversion of green, undisturbed areas in the local area. In this project, both sites indicated were larger than 10 hectares in extent.

While the development of the Vooruitzigt creates a significant new footprint, neither area is unique in terms of vegetation. Available gap analysis data supports this. In addition, the area is significantly degraded due to historical overutilization and local disturbances. According to Rouget et al. (2004) around 98-99 % of this veld type remains fully intact and the goal of protecting 16 % will not be adversely affected by this project. The area is also not under consideration in the National Protected Area Expansion Strategy (2010).

Study area sensitivity analysis suggests that the site has a Medium Low SENSITIVITY because only Least Concerned and ToPS species are routinely recorded in the area and veld type in general. However, even with both sites combined they form only a very small section of the quarter degree square (QDS Barkly West 2824 Da and Kimberley 2824 Db) and cannot be reasonably expected to hold all the recorded species. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum).

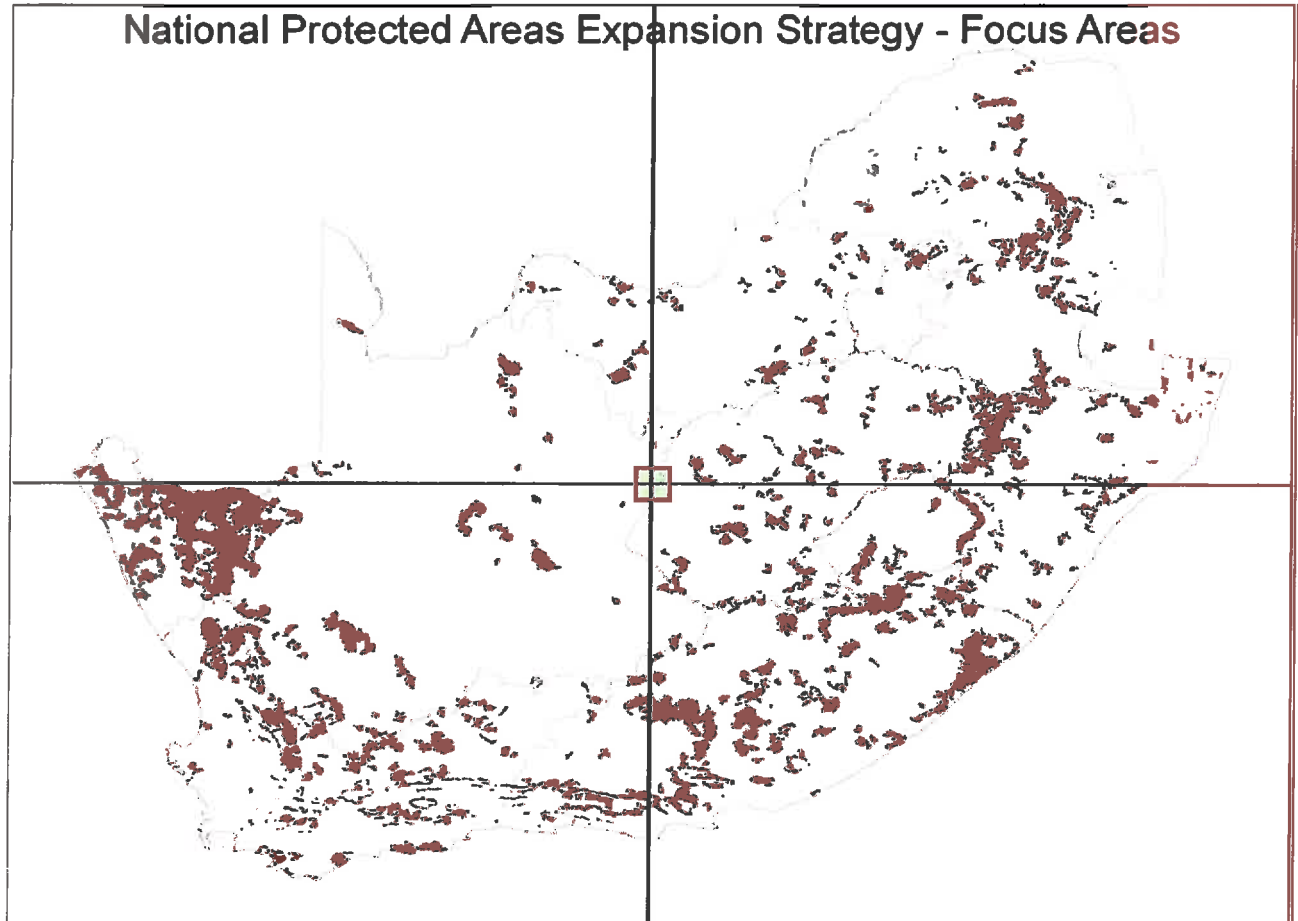


Figure 4. Focus areas for land-based protected area expansion (large, intact and unfragmented areas of high importance, suitable for the creation or expansion of large protected areas) indicating the location of Vooruitzicht mine project.

Heritage and Cultural Resources

Findings of the HIA survey

A western portion of the property bears scars of excavations of varying depths which are ongoing in some areas. From an archaeological standpoint, the area is considered as disturbed and no archaeological provenances pre-dating the city can be expected to have survived the impact of these activities. Furthermore there are no elements of heritage value relating to the development of the city.

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Two mounds (Sites P9 & P10) which form the eastern ends of parallel ridges appear to be a mixture of household refuse and/or industrial discard perhaps dating back more than 60 years. Although the rating for heritage value is low, material / artefacts found therein might be of relevance in the fields of historical archaeology / industrial archaeology. However these two disciplines have not yet been formally

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In the event that the prospecting operation does not proceed, the heritage resources will remain as is. The protection and preservation of these resources are therefore not guaranteed. However, if the prospecting operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off if any of these resources are encountered.

Palaeontology

The proposed activity entails excavating 50 test trenches. It is estimated that an average 3m depth of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2 – 4m) which is host to the diamonds. The trenches will be 25m x 15m x 0.5 – 7m deep. A palaeontological assessment is necessary as these superficial levels might contain fossils in view of the known palaeontological sensitivity of the area.

The rock units underlying the area of the proposed development have been identified from the 1: 250 000 geology map 2824 Kimberley (Council for Geosciences, Pretoria), scientific literature and previous palaeontological impact assessments that have been conducted in the broader area. The following is a summary of the findings:

The Allanridge Formation andesite lavas belong to the Ventersdorp Supergroup (VSG) which date back to the Precambrian 2600 MYA. The Ventersdorp Supergroup represents a major episode of igneous extrusion, what is termed a Large Igneous Province (LIP) from below the Kaapvaal Craton some 2.7 Ga (billion years) ago. The Allanridge Formation of igneous lavas are considered to be unfossiliferous.

The Dwyka Group forms the lowermost and oldest deposit in the Karoo Supergroup basin. Northwest of Kimberley the rocks in this group exhibit glacial pavements - glacially-striated and eroded bedrocks – of Permo-Carboniferous age, (c. 300 Ma) that tend to overlie the Allanridge Formation outcrop area in the same region. The Dwyka tillite is mostly a very fine-grained, blue-grey rock comprised of clay / mud matrix with inclusions (or clasts) of many other fragments picked up by glaciers during their travels. The paleontological rating of the glacial tillites of the Dwyka Group are considered to be medium to low.

The Ecça group is a subcomponent of the Karoo Supergroup, a sedimentary complex post-dating Dwyka in which principally shales and sandstones were laid down in the sandy shorelines of swamplands during the Permian Period. The Ecça fossil marine deposition may contain marine invertebrates (esp. molluscs, brachiopods), coprolites, palaeoniscoid fish & sharks. There are also traces fossils, various microfossils, petrified wood. The palaeontological rating according to Almond (2012) is high.

The Karoo dolerite of the Drakensberg Group sill underlies most of the area in the Kimberley municipal area. It represents an intrusion of igneous lavas between 183.0 to 182.3 MYA. Dwyka shales lying immediately below the dolerite sheet have usually been metamorphosed to lydianite and homstone as a result of exposure to intense heat during the intrusion event, with a possibility of destroying fossil materials in the upper layers of these sediments. The Karoo dolerite (igneous lavas) are considered to be unfossiliferous.

Large areas of unconsolidated, reddish-brown to grey aeolian (i.e. wind-blown) sands of the Quaternary Gordonia Formation (Kalahari Group) have been observed on the western outskirts of Kimberley and at the Farm Vooruitzigt 81 and Fieldsvie north of the city. Immediately below the sands may be a calcretic layer or pedogenic limestones generally considered of the same geological period. They are considered of low sensitivity with the possibility of finding calcretised rhizoliths & termitaria, ostrich egg shells, land snail shells, rare mammalian and reptile (e.g. tortoise) bones, teeth freshwater units associated with diatoms, molluscs, stromatolites etc.

Although the impact of the proposed development on fossil resources is expected to be minimal, it is still recommended that the Environmental Control Officer (Eco) put in place a contingency plan to rescue chance finds and where possible preserve them in situ. A standard Fossil Finds Procedure (FFP) is appended to this report to provide field guidance to the ECO. The recommendations made here should also be incorporated into the Environmental Management Plan for the proposed mining operations. (PALAEOLOGICAL SPECIALIST ASSESSMENT (DESKTOP) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE May 2017 Prepared by Joseph Chikumbirike (PhD Palaeontology, University of the Witwatersrand)).

Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the prospecting operation is

approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

ii) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The consultation process with interested and affected parties (neighbouring farmers and land owners) was completed for the Basic Assessment Report that was submitted and consisted of the process below.

The process as described by NEMA for Environmental Authorisation was followed. See table below for the identification of Interested and Affected Parties to be consulted with. A copy of a background document which covers the activities from the relevant Prospecting Work Programme (“PWP”) with a cover letter was sent by registered mail to all listed parties below. Notice fliers were also put in all post boxes surrounding the area. A notice was also put up at the gate of the area and the Community SAP station as well as the library.

A notice was published on 29 February 2016 for a public meeting in the DFA at the Housing Support Centre Galeshewe (cnr of Moshoeshoe and John Daka Streets) on 15 March 2016 @ 11.

The meeting was attended by:
Frank Crossley of Mystic Pearl 157 Pty Ltd
Thabo Hendricks
Solomon Bennett (0742854522)
Hester Geyer (0836437179)
Freddy Long (0836937179)

The Scoping Report was put on disc and was distributed to all the registered parties per registered mail on the 26 April 2017.

Notices were placed at the gate of the area and the Community SAP station as well as the library on the Scoping process to be undertaken. The Scoping Report was also left at the Kimberley Library for any interested and affected parties to scrutinize.

A special public meeting were held on 10 October 2017 at the Platfontein computer Laboratory. The meeting was attended by the Xun and Khwe CPA. The Agenda, minutes and attendance register is part of Annexure A to the document.

iii) Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)
Table 3: Consultation with I&APs

Interested and Affected Parties		Date	Issues Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted					
AFFECTED PARTIES					
Landowner/s	X				
Sol Municipality Private Bag X 5030 Kimberley 8300	X	26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.	2 Feb 2016 registered letter send to Municipality. Circulation letter dated 04 July 2013	No response necessary	
Lawful occupier/s of the land					
There are no lawful occupiers.					
Landowners or lawful occupiers on	X				

adjacent properties							
Mr P.A. Els (neighbour) PO Box 77 Cartersridge Kimberley 8300	X	26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.	No comments received up to date				
Mr Frans Louw (neighbour) Schreiner Street 12 Hadisonpark Kimberley 8300	X	26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.	No comments received up to date.				
Mr A.J. Steenkamp (neighbour) PO Box 224 Kimberley 8300	X	26 April 2017 a registered letter with the scoping report was send	No comments received up to date.				

	per registered post. Registered letter with EIA EMP was send.						
Kimcrush (Pty) Ltd (neighbour) PO Box 28832 DANHOF Boemfontein 9310	X 26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.	01 March 2016	There is a valid prospecting permit registered on the property. A substantial investment of R65 million has already been invested in prospecting activities. We are employing more than 100 people on the operation. The nature of the prospecting operation prevents other activities like blasting and earthmoving.	We have placed on record that the area of Kimcrush does not overlap the application area of Mystic Pearl. A surveyor was instructed to survey the areas and a map was created which clearly shows that the area does not overlap.	Section I (ii)		
Municipal Councillor	X						
Municipality	X						
Sol Municipality Private Bag X 5030 Kimberley 8300	X 26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with	No comments Received up to date					

	EIA EMP was send.				
<p>Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA</p>	<p>X</p>	<p>26 April 2017 a registered letter with the scoping report was send per registered post.</p>	<p>No comments received up to date</p>	<p>Registered letter with EIA EMP was send.</p>	
<p>ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development PO Box 606 Kimberley 8300</p>	<p>X</p>	<p>26 April 2017 a registered letter with the scoping report was send per registered post.</p>	<p>No comments received up to date</p>	<p>Registered letter with</p>	

<p>Dept. of Agriculture, Forestry and Fisheries: Directorate: Forestry Management PO Box 2782 Upington 8800 Tel 054 3385909 Fax 054 3340030</p>	<p>EIA EMP was send. Also e-mailed as per request</p>	<p>26 Feb 2016</p>	<p>The report stated that initial prospecting activities will be non-invasive and restricted to a desktop study and that subsequent phases will be of the non-invasive type. According to page 13 of the report, the area to be impacted on is about 253 ha, but no indication was given of the affected vegetation types and their threat status. The report stated that decommissioning will only commence once all prospecting is completed. What is the planned duration of the prospecting phase?</p> <p>Protected trees should be avoided as far as possible during invasive prospecting activities. Placement of small access roads and or any other associated infrastructure such as office area and storage areas should avoid slow-growing protected trees as far as possible. Areas with high density</p>	<p>Not mandated yet for response to send out botanist and get specialist flora report to make sure all comments are adequately covered.</p>	<p>vii) Positive and negative impacts of proposed activity and alternatives viii) Possible mitigation measures that could be applied under Indigenous Vegetation i) summary of Key findings of the EIA Impacts to be mitigated in their respective phases Maintenance and Aftercare d) Explain why it can be</p>
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			<p>protected trees should be regarded as “sensitive “it should be mapped and avoided as far as possible. If protected trees cannot be avoided, a licence must be applied for and obtained prior to disturbance of such species.</p> <p>Please do a search and rescue of plants of special concern (i.e. endemic species; provincially protected or specially protected species; CITES listed species and TOPS listed species) prior to disturbance of natural vegetation. Succulents such as Aloe species should be rescued and transplanted after obtaining the necessary Flora Permit from the Provincial Department of Environment and Nature Conservation (DENC).</p> <p>The developer may also need a Flora Permit from the DENC for destruction of natural indigenous, protected or specially protected plant species under the Northern Cape Nature Conservation Act, Act 9 of 2009 (NCNCA). The same applies to TOPS or CITES listed plant</p>	<p>confirmed that the rehabilitation plan is compatible with the closure objective</p> <p>Mechanisms for monitoring compliance with and performance assessment.</p>
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<p>Department of Water and Sanitation Private Bag X 6101 Kimberley 8301 Tel 053 836 7600 Fax 053 842 3258</p>	<p>X 26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.</p>	<p>22 Feb 2016</p>	<p>species under the NEMBA. Distance of the water course Storm Water Management Invasive Alien Vegetation Design and layout of Prospecting Activities Construction Waste Management Rehabilitation Water use entitlement</p>	<p>Will be addressed in WULA application which will be submitted shortly.</p>	<p>m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMP ii) Volumes and rates of water use required for operation iii) Volumes and rates of water use required for operation iii) WULA application</p>
<p>Dept. of Agriculture, Land Reform & Rural Development Private Bag X5108 Kimberley 8300</p>	<p>26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.</p>				

<p>National Dept. of Public Works P.O. Box 1931 Kimberley 8300</p>	<p>26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send.</p>				
<p>SAHRA P.O. Box 4637 Cape Town 8000</p>	<p>26 April 2017 a registered letter with the scoping report was send per registered post. Registered letter with EIA EMP was send. Also loaded on line.</p>				
<p>Dept. Environmental Affairs Department of Environment and Nature Conservation Private Bag X 6010 Kimberley 8300</p>	<p>26 April 2017 a registered letter with the scoping report was send per registered post.</p>	<p>No Comments received yet.</p>			

	Registered letter with EIA EMP was send.				
Other Competent Authorities affected					
<u>OTHER AFFECTED PARTIES</u>					
None came forward or registered during the previous process.					
<u>INTERESTED PARTIES</u>					
None came forward or registered during the previous process					

* Note: The contents of this table have been recorded up to 27 October 2017 as the process of public participation is an ongoing process.

iv) **The Environmental attributes associated with the development footprint alternatives** (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) **Baseline Environment**

(a) **Type of environment affected by the proposed activity** (its current geographical, physical, biological, socio-economic, and cultural character)

(1) **GEOLOGY:**

Regional Geology

The area surrounding the application area hosts numerous kimberlites and alluvial diamond deposits.

Diamond deposits can be classified as primary (kimberlites and lamproites) and secondary (alluvial and marine). Diamonds are known to occur in a variety of rocks, however the only known economically significant primary sources of diamonds are kimberlite and lamproite. No significantly diamondiferous lamproites are known in South Africa where the primary sources mined are kimberlite pipes and dykes.

Over 800 kimberlite occurrences have been identified in South Africa, but only 50 carry significant quantities of diamonds. Many occurrences are sub-economic due to the low grade or quality of the diamonds or the insufficiency of the size of the ore body.

The Kimberley District of the Northern Cape Province is situated near the western margin of the Kaapvaal craton, which is associated with the occurrence of kimberlitic emplacements. Two distinct types of kimberlite are recognised: Group I, or olivine-rich, monticelliteserpentine-calcite kimberlites and Group II, or micaceous kimberlites. Historically, these were respectively referred to as “basaltic” and “micaceous lamprophyric” kimberlites. These distinctive groups are derived from sources in the earth’s mantle that are either slightly depleted (Group I), or enriched (Group II) with respect to light rare earth elements. This enrichment and depletion is evidence of past metasomatic processes occurring in the mantle.

Kimberlites were emplaced along several parallel north-northeast and east-west trending structures located along the southern, western and northern boundaries of the Kaapvaal Craton. There have been several

pulses of kimberlite emplaced into the Kaapvaal Craton. Typically kimberlite intrusions occur in swarms or clusters.

The erosion of diamondiferous kimberlites liberates diamonds onto the land surface, for redistribution by streams and rivers. The processes that lead to the deposition and concentration of diamond in river sediments are obviously of direct importance in the formation of economic alluvial diamond deposits (or diamond placers). It is believed that these diamond deposits continue onto the application area.

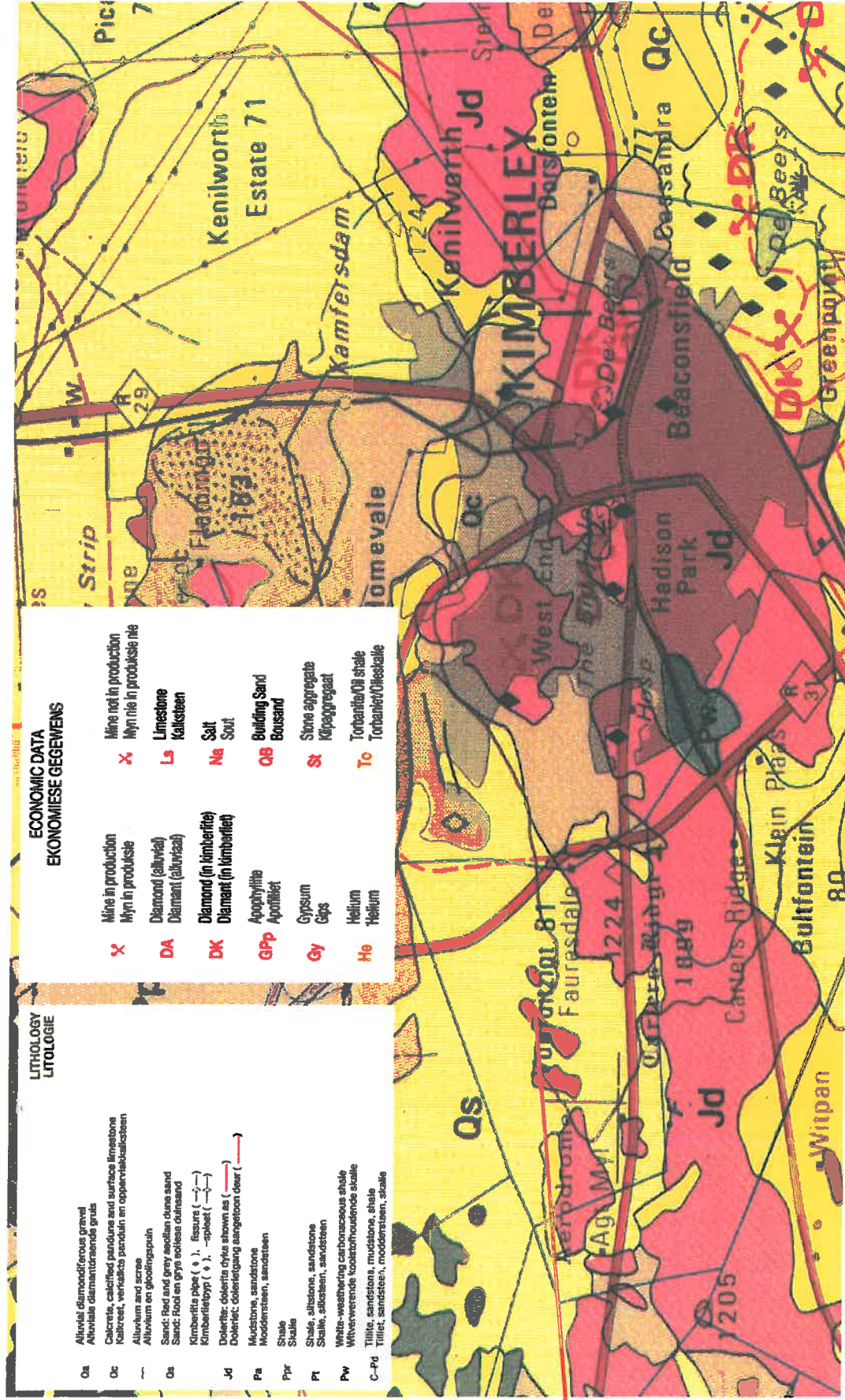


Figure 5. Extract from 1:250 000 geological map 2824 Kimberley (Council for Geoscience, Pretoria) showing location of A Portion of Portion 1 of the farm Vooruitzicht 81, Kimberley district application area indicated with RED arrow.

CLIMATE:***Regional Climate:-***

The Northern Cape is classified as a semi-desert and is known to have summer rains with high temperatures in the Summer (as high as 38°C to 40°C) and cold Winters (temperatures ranging from -4°C to -6°C). The sun shines approximately 80% during Summer and approximately 70% during the Winter.

Average Annual Rainfall:-

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Ave rainfall (mm)	77	69	67	40	17	6	5	10	19	38	55	60	463
Ave rain days/month	6.5	5.7	6.2	4	1.6	0.9	0.8	1	1.6	3.5	5.2	5.9	43

Rainfall Intensity:-

Most of the rainfalls occur during thunderstorms in the summer months as well as during cloud bursts where maximum rainfalls were measured of up to 112.5mm at a downpour of approximately 60 minutes.

Average Maximum and Minimum Temperatures:

The average maximum temperature measured during the summer is 30.9°C and the minimum during the Winter months is 3.4°C.

Average Monthly Wind Direction and Speed:-

The prevailing wind direction in the area is mainly from the north to north-westerly with the strongest winds from the west-southwest to north-northwest that occurs between August and December. October and November month are common for high wind speeds of up to 4.85 metres per second.

Average Monthly Evaporation:-

It is estimated that the average annual evaporation rate is approximately 2365mm which indicates the dry climate conditions in this area.

Presence of Extreme Climatic Conditions:-

Hail:	October to March
Frost:	May to September
Strong Winds:	Occasional strong winds occur but not often
Droughts:	Normal for a dessert area – approximately 6 out of 10 years

(3) **TOPOGRAPHY:**

The topography of the project area is relatively flat, with only a few small undulating low hills at an elevation of 1 200 m above sea level. No significant drainage lines were noted but surface drainages in the northwestern area are indicated in the 1 : 700 000 topographical maps provided by the developer. However, as seen in Figure 6, the immediately adjacent areas 9 km to the north (Platfontein Pan) and 7 km northeast (Kamfers Dam) have significant water features that are fed by water runoff from this area as well as Kimberley waste water respectively. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum). Annexure B to this Report.

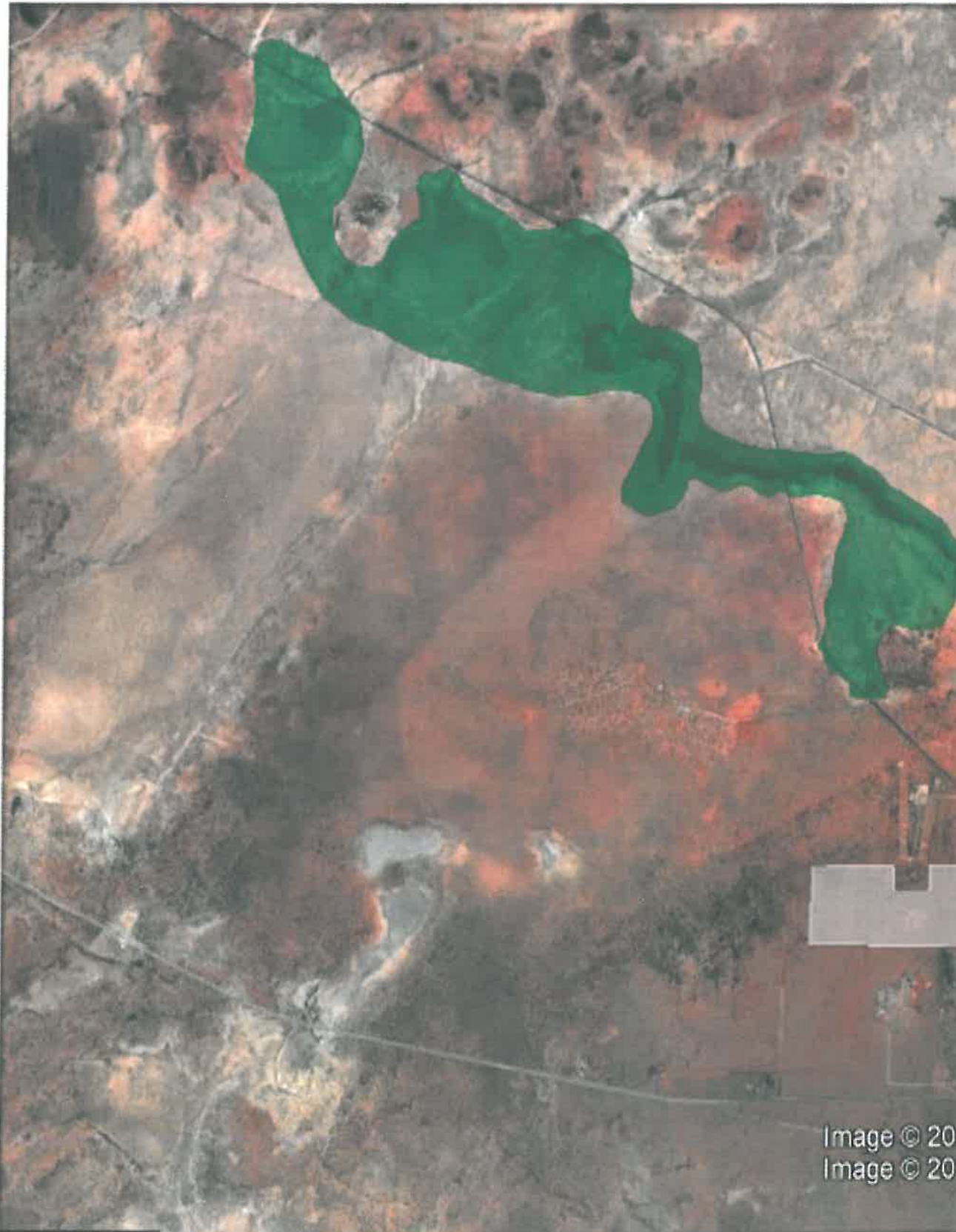


Figure 6. Google Earth satellite image of the Vooruitzigt project area (white polygon), historic Otto's Kopje and surrounding wetlands (red shaded polygon). (Ecological SPECIALIST STUDY FOR THE PROPOSED DEVELOPMENT OF OTTO'S KOPJE DIAMOND MINE, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE, A

(4) **SOILS:**

According to CDSLI (1993) the geological features on Vooruitzigt mainly comprise quaternary deposits, where red windblown sand covers almost the entire surface.

(5) **LAND CAPABILITY AND LAND USE:**

Beryl Wilson has been appointed by Mystic Pearl to provide an Ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area.

The Vooruitzigt project site as indicated by the developers will be 254 ha in extent. To the northwest is the SANDF military rifle range and the San community on the farm Platfontein that was relocated from Schmidtsdrift in the 1990s. Directly north is the unoccupied farm Wildebeeskul. Adjacent to the entire eastern side of the project site is the township area of Galeshewe that forms the western parts of Kimberley. To the western side are the municipal refuse dumping areas and the John West Airfield.

Whilst there are no formal public access roads, the area is crisscrossed by unmaintained dirt roads and pathways.

The area is undeveloped but previously disturbed by large-scale and unrehabilitated mining activities (particularly in the southeastern areas of the proposed area), public fly-tipping and illegal waste dumping as well as poaching, firewood collection and illegal grazing activities by local adjacent communities. There are no fully maintained fencing structures or excluded areas currently.

Currently, due to historical disturbances at the Vooruitzigt project site as well as the current illegal wood-gathering activities, the area in general has been denuded of larger tree structures. The browsing and grazing activities of local livestock have also impacted on the vegetational structure and some areas show significant trampling. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum). Annexure B to the report.

(6) NATURAL FAUNA:

Beryl Wilson has been appointed by Mystic Pearl to provide an Ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area.

Considering the location and habitat in the areas, and with reference to literature and available databases, the Vooruitzigt project area and surrounds contains the following total possible species breakdown as indicated in Table 4. A full species list can be seen in Appendix 1 of the study appended as Annexure B.

Table 4. Faunal composition in the Vooruitzigt Mine Project areas and surrounds

FAUNAL GROUP	POTENTIAL NUMBER OF SPECIES IN THE GENERAL AREA	NUMBER OF SPECIES OF CONSERVATION CONCERN
Birds	242	35
Mammals	54	5
Reptiles	48	1
Amphibians	14	1
Selected Arachnids	~ 11	~ 7
TOTAL	358 (+~ 11)	~ 49

Since all birds, bats and larger mammals and reptiles are mobile, it is naturally assumed that there will be movement in and out of the immediate vicinity of the project locations and this was considered together with the location, vegetation and nearby mining disturbances. The preferred habitat and ethological requirements of each species of concern was then considered, with reference to literature and available databases. It should be noted that certain species are routinely under-reported, particularly those that are nocturnal, secretive, migratory, vagrants, subterranean or hard to identify (e.g. quails, cisticolas, pipits, larks, nightjars, shrews, lacertids, amphisbaenids, arachnids, etc.).

Typically, faunal species diversity in the region is relatively low as is expected in semi-desert and generally widely-disturbed areas. With this in mind, the number of potential naturally-occurring species with similar habitat requirements as those in the project and surrounding areas was calculated. Species that have historical distributions in this region have been included too. Naturally, it is not guaranteed that these species will be present, but the possibility that these species remain in undisturbed or more suitable adjacent areas needs to be considered. From this group, the number of conservation-worthy species was then determined and discussed. It should be noted that only arachnids

(spiders and scorpions) with protected statuses have been included for consideration.

Species of conservation concern

There are several species of conservation concern that have geographical distributions that include the proposed project areas.

Based on habitat, ethological requirements and investigative evidence, there were 21 species of conservation concern that may be present on or near the project sites. However, it should be noted that additionally, all raptor species are Protected Species (regardless of their Red List Status) under the ToPS.

The species of conservation concern include:

- Kori Bustard (Near Threatened)
- Blue Crane (Near Threatened)
- **Western Barn Owl (Protected Species)**
- Southern White-faced Scops Owl (Protected Species)
- Pearl-spotted Owlet (Protected Species)
- **Spotted Eagle-Owl (Protected Species)**
- Verreaux's (Giant) Eagle-Owl (Protected Species)
- **Black-shouldered (Winged) Kite (Protected Species)**
- Yellow-billed Kite (Protected Species)
- White-backed Vulture (Critically Endangered)
- Cape Vulture (Endangered)
- Lappet-faced Vulture (Endangered)
- Black-chested Snake-Eagle (Protected Species)
- African Marsh Harrier (Endangered)
- Black Harrier (Endangered)
- **Southern Pale Chanting Goshawk (Protected Species)**
- Gabar Goshawk (Protected Species)
- Jackal Buzzard (Protected Species)
- **Steppe (Common) Buzzard (Protected Species)**
- Tawny Eagle (Vulnerable)
- Booted Eagle (Protected Species)
- African Fish Eagle (Protected Species)
- Martial Eagle (Endangered)
- **Secretarybird (Vulnerable)**
- Pygmy Falcon (Protected Species)

- **Lesser Kestrel (Vulnerable)**
- Rock Kestrel (Protected Species)
- Greater Kestrel (Protected Species)
- Amur Falcon (Protected Species)
- Lanner Falcon (Vulnerable)
- **Greater Flamingo (Near Threatened)**
- **Lesser Flamingo (Near Threatened)**
- Black Stork (Near Threatened)
- Yellow-billed Stork (Near Threatened)
- Marabou Stork (Near Threatened)
- **Southern African Hedgehog (Near Threatened)**
- **Dent's Horseshoe Bat (Near Threatened)**
- Cape Fox (Least Concern / Protected Species)
- **African Wild Cat (Protected Species)**
- Black-footed Cat (Vulnerable)
- **Southern Rock Monitor (Protected Species)**
- Giant Bullfrog (Near Threatened)
- Horned Baboon Spiders – 2 species (Protected Species)
- Trapdoor Baboon Spider (Protected Species)
- Junodis Golden Baboon Spider (Protected Species)
- **Burrowing Scorpions – 3 species (Protected Species)**

Of these only 16 (sixteen) marked in bold are considered to have high possibility of occurring on the site or making use of the habitats available on the sites either permanently, seasonally or transiently. All the species with conservation status' are discussed in more detail in Appendix 2 of the Fauna report. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum) Annexure B to the report.

(7) **NATURAL VEGETATION:**

The study area falls within the Savanna Biome (Mucina and Rutherford 2006) and according to the vegetation map of Mucina and Rutherford (2012), the entire site is represented by Kimberley Thornveld. Kimberley Thornveld is distributed in the North-West, Free State and Northern Cape Provinces at altitudes between 1 050 and 1 400 m. It is found in the Kimberley, Hartswater, Bloemhof and Hoopstad Districts,

but is also within the Warrenton, Christiana, Taung, Boshof and Barkly West Districts. The unit is typically presented as slightly undulating sandy plains with a well-developed tree and shrub layer and an open grass layer. Andesitic lavas of the Allanridge Formation occur in the north and west, while fine-grained sediments of the Karoo Supergroup are found in the south and east. Soils are deep, sandy to loamy, and of the Hutton form. The most common land types are Ae and Ah. The unit is classified as being least threatened, but 18 % has already been transformed, predominantly by cultivation. Only 2 % is currently conserved in statutory reserves and no endemic species are known from this unit. It is specifically prone to *Senegalia mellifera* encroachment following overgrazing, but the occurrence and risk of erosion is very low. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum).

Population of sensitive, threatened and protected plant species

The SANBI Red List provides information on the national conservation status of South Africa's indigenous plants, while the National Forests Act (No. 84 of 1998) (NFA) and the Northern Cape Nature Conservation Act (Act No. 9 of 2009) (NCNCA) restricts activities regarding sensitive plant species. Section 15 of the NFA prevents any person to cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister. Section 49 (1) and 50 (1) of the NCNCA states that no person may, without a permit pick, transport, possess, or trade in a specimen of a specially protected (Schedule 1) or protected (Schedule 2) plants. Furthermore, Section 51(2) states that no person may, without a permit, pick an indigenous plant (Schedule 3) in such manner that it constitutes large-scale harvesting.

Most species recorded in the area are classified as least concern; a category which includes widespread and abundant taxa (Table 5). However, two species, i.e. *Drimia sanguinea* (Near Threatened) and *Oxalis setosa* (Data Deficient – Taxonomically problematic) are listed. The population of *D. sanguinea* has declined by 20 - 25% in the last three generations (generation length 20 years) due to harvesting for the medicinal plant trade, especially for the Gauteng trade. Declines are expected to continue. None of these species were observed during the field survey, but the study site should ideally be transversed during summer to confirm their absence from the site.

Table 5. Plant species found in the region that are of conservation concern.

FAMILY	Scientific name	Status	NFA	NCNCA
FABACEAE	<i>Vachellia erioloba</i>	LC	X	
GERANIACEAE	<i>Pelargonium aridum</i>	LC		S1
HYACINTHACEAE	<i>Drimia sanguinea</i>	NT		S2
IRIDACEAE	<i>Babiana bainesii</i>	LC		S2
OXALIDACEAE	<i>Oxalis setosa</i>	DDT		S1
PEDALIACEAE	<i>Harpagophytum procumbens</i>	-		S1

Vachellia erioloba, previously listed as declining, is currently regarded to be widespread and common. Although it may be declining in some places, it is not in danger of extinction. Concerns in the past have been raised over the large volumes of Camel Thorn wood being removed for commercial sale of firewood. Many trees are also killed as a result of bush encroachment control through pesticides. A study conducted in the Northern Cape indicated that at present only dead trees are being harvested for firewood and only a very small percentage of the study area (<2%) was affected by clearing of this species. Nevertheless, this species is protected in terms of the National Forests (NFA) Act No 84 of 1998.

In order to damage or remove any protected trees (seedlings to adults) an application must be submitted to the Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF) and a licence obtained from DAFF at least three months prior to such activities.

In addition to those protected species listed above; according to Section 51(2) of NCNCA, a permit is required from the Northern Cape, Department of Environment and Nature Conservation (DENC) for any large-scale clearance of all indigenous (Schedule 3) vegetation, before such activities commence.

(8) SURFACE WATER

Beryl Wilson has been appointed by Mystic Pearl to provide an Ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area.

The topography of the project area is relatively flat, with only a few small undulating low hills at an elevation of 1 200 m above sea level. No significant drainage lines were noted but surface drainages in the

northwestern area are indicated in the 1 : 700 000 topographical maps provided by the developer. However, as seen in Figure 6, the immediately adjacent areas 9 km to the north (Platfontein Pan) and 7 km northeast (Kamfers Dam) have significant water features that are fed by water runoff from this area as well as Kimberley waste water respectively. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum).

Surface water quality:

With the alluvial gravels not having any harmful or toxic substance, water emanating from the prospecting property will not contaminate any surface water source.

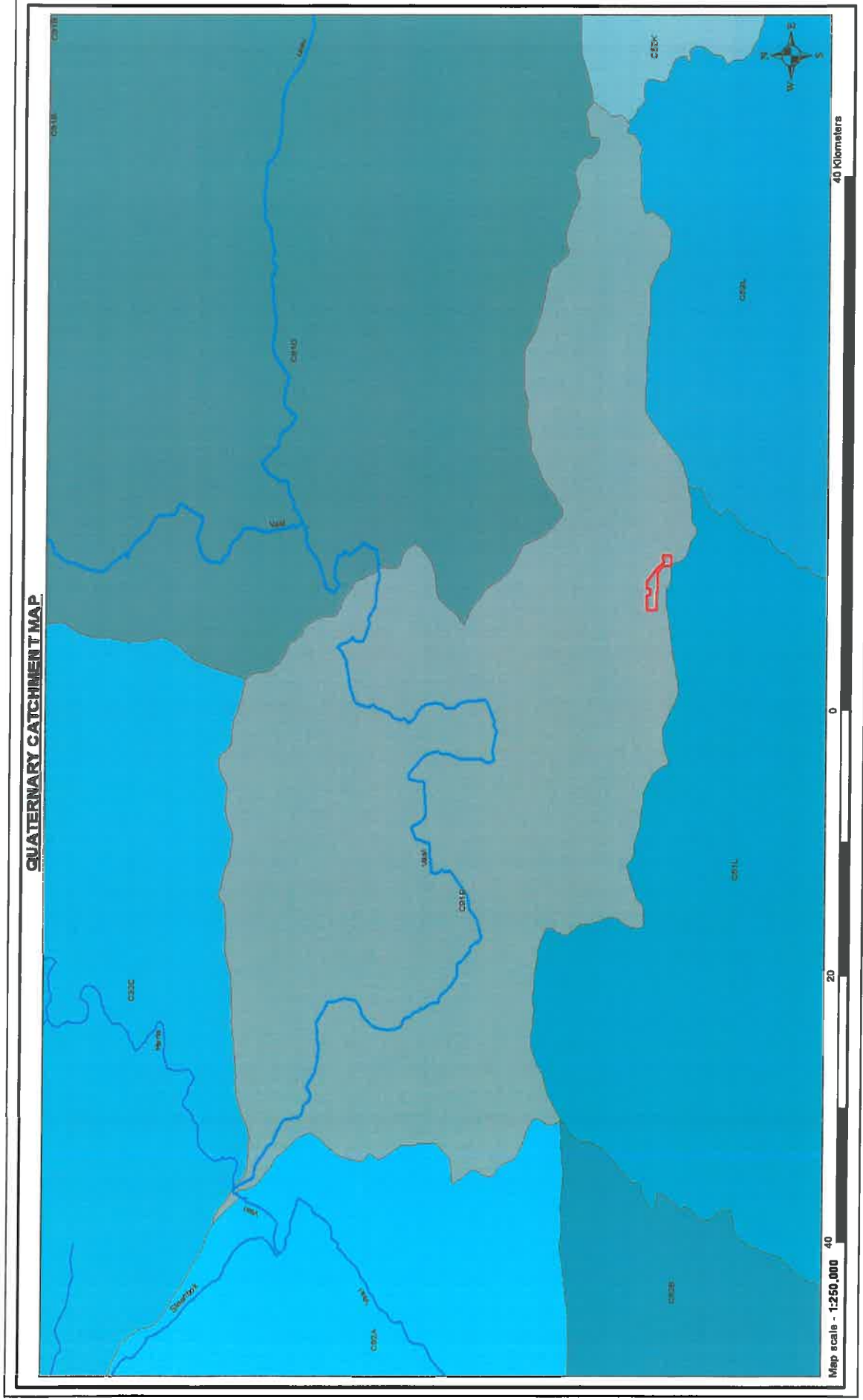


Figure 7. The locality of the proposed prospecting area in relation to the quaternary catchments of the area.

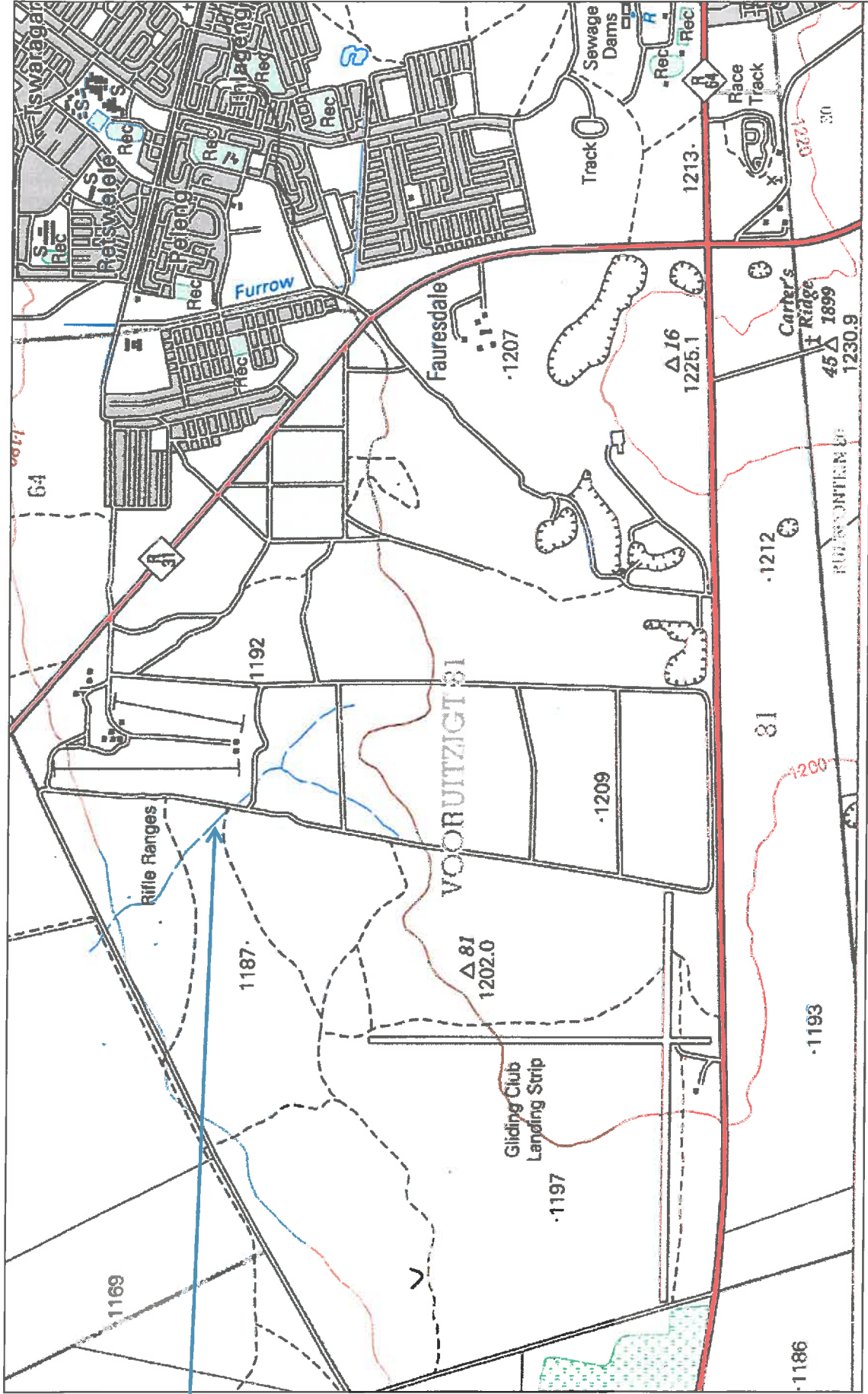


Figure 8. The location of formally mapped watercourses on the proposed prospecting right area.

(9) **GROUND WATER:**

SRK Consulting has been appointed by mystic pearl to provide a basic groundwater assessment in order to highlight the groundwater characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the groundwater of the application area.

Scope of Report

No formal terms of reference were provided, however, in order to complete a preliminary assessment of the proposed mine's impact on the groundwater resource in the area, SRK proposed that a baseline and impact study be undertaken which required that the following scope of work be executed:

1. Collate available groundwater information such as those data at the Department of Water Affairs' (DWA) national groundwater archives (NGA), the DWA 1:500 000 hydrogeological map series, the DWA phase 2 national groundwater resource assessment data, satellite images and published geological maps and reports;
2. Conduct a hydrocensus of the site and the surrounding area (2 km radius);
3. Undertake satellite image lineament mapping for the area to ascertain if there are any significant faults or dykes near or beneath the site which may form a conduit for movement of contaminants into the aquifer;
4. Capture the data collected in a GIS database;
5. Assess impacts on groundwater and recommend mitigation measures to reduce the potential impacts; and
6. Compile a report in which the groundwater baseline conditions and impacts are described and the results and recommendations summarized.

Impacts associated with the mine are not considered in this report.

Purpose of Report

The purpose of this report is to provide an independent hydrogeological assessment of the baseline groundwater conditions and resources at the site, and to carry out a preliminary assessment of the potential groundwater impacts that may arise as a result of the proposed processing plant. In addition, it is a requirement to advise the client about necessary precautions to be taken to protect the groundwater resources of the area.

Methodology

A hydrocensus was conducted on 7 August 2017 at the site and immediate surrounds. Simultaneously, hydrogeological information (borehole depth, yield, groundwater intersections, groundwater use and estimated abstraction, etc.) was collected for the area. Additional information obtained from the DWS National Groundwater Archive (NGA) was added to this database.

Aquifer Characteristics

Groundwater at the site occurs mainly in a secondary (or fractured-rock) aquifer system. Secondary aquifers are formed by jointing and fracturing of the otherwise solid bedrock. Joints and fractures are formed by faulting, cooling of magma outflows, intrusion of dolerite dykes and sills, intrusion of kimberlite pipes and fissures, folding and other geological forces. Generally, the harder rocks (sandstone and dolerite) fracture more easily under stress to form superior aquifers compared to the softer sediments like shale and mudstone, which rather deform than fracture under stress.

Successful boreholes may also abstract groundwater from the weathered zone in areas where the groundwater levels are shallow, i.e. <10 metres below ground level (mbgl). These weathered aquifers behave like unconsolidated aquifers and successful boreholes can be placed at random in these areas. However, these aquifers have a restricted distribution and are very vulnerable to droughts. Therefore it does not form an important aquifer in this study area.

According to the 1:500 000 Hydrogeological map sheet of Kuruman (DWAF, 2003), the site falls within Quaternary Catchment C91E. It straddles both a fractured-rock aquifer with expected yields ranging between 0.5 – 2 L/s and an intergranular and fractured-rock aquifer with expected yields ranging between 0.0 and 0.1 L/s. The fractured-rock aquifer occurs in the central and northern part of the site and the intergranular and fractured-rock aquifer in the far southern part of the site. The proposed localities for the processing plant and slimes dam are in the southern part of the site and underlain by the latter aquifer.

Figure 4-1 in the ground water report attached as Annexure F also indicates that the groundwater quality expressed as electrical conductivity (EC), throughout the study area ranges between 70 and 300 mS/m and therefore is only marginally suitable-to-unsuitable for human consumption, according to the SANS 241:2015 Drinking Water Guidelines. However, groundwater quality may deviate from this “average range” and the sandstone beds and dolerite and kimberlite intrusions may yield groundwater with lower ECs. For example, groundwater from a sandstone layer below the top dolerite sill at the Kimberley Big Hole has a measured EC of approximately 60 mS/m.

The aquifer vulnerability of the site is indicated in Figure 4-2 in the ground water report as Annexure F. Vulnerability is determined by evaluating seven parameters, namely:

- Depth to groundwater;
- Recharge;
- Aquifer media;
- Soil media;
- Topography;
- Impact on vadose zone; and
- Hydraulic conductivity.

Aquifer vulnerability is defined as the likelihood for contamination to reach a specified position in the groundwater system after being introduced at some point above the uppermost aquifer. Figure 5 2 in the ground water report indicates that the groundwater source of the site has a low medium to high vulnerability to contamination from surface sources. The only area of low medium groundwater vulnerability exists in the extreme south-eastern side of the property. Aquifer vulnerability in the area directly north thereof is classified as medium. The central and northern parts of the site are underlain by an aquifer with high groundwater vulnerability. The high groundwater vulnerability in this area is mainly caused by shallow groundwater levels. Figure 4-2 in the groundwater report also indicates that the proposed sites for the slimes dam and processing plant are in the area where aquifer vulnerability is the lowest. In this area the aquifer occurs beneath a dolerite sill. This sill is approximately 25-30 m in vertical thickness and forms an aquiclude above the underlying Ecqa aquifer. The mean annual recharge for the area increases from north to south ranging from 7 to 9 mm/a. Although this seems contradictory to the rainfall distribution, factors such as slope, soil type, depth to groundwater level and others also influence recharge. Recharge at the site varies between 7.8 mm/a in the north and 8.6 mm/a in the south. (Groundwater Assessment of Portion of Portion 1 of the Farm Vooruitzigt 81, Northern Cape Province. Report Prepared for Mystic Pearl. SRK Report No: 433862 August 2017).

Groundwater levels in the area surrounding the site are relative shallow ranging between 6.7 and 15.7 mbgl. The latter groundwater level was measured in borehole G00158NC directly west of the southern boundary of the site. This deeper groundwater level is linked to a high lying area and the groundwater elevation of this borehole is similar to that of borehole VT4 (1 212 mamsl). Groundwater levels immediately north of the area are shallower due to lower lying terrain. However, the groundwater elevation in this area is lower than in the area south and southeast of the site, which suggests that groundwater flow at the

site is roughly from southeast to northwest. This flow direction is similar to the surface water drainage direction, which is to be expected as natural groundwater flow directions in the Karoo regions usually mimics surface water flow directions.

EC values measured during the hydrocensus vary between 190 and 280 mS/m. These relatively high EC values are normal for groundwater of the Karoo region. These values are also similar to the published (DWAF, 2003) average values for Quaternary GRU C91E in which the site is located.

It is evident that no mapped structures intersect the site area. Therefore the proposed localities for the Boerevestnik plant and slimes dam are favourable and in an area with a reduced risk to contaminate groundwater.

It is concluded that the negative impact of proposed plant and slimes dam on groundwater is medium low and with mitigation measures implemented, the risk of groundwater contamination, is low. (Groundwater Assessment of Portion of Portion 1 of the Farm Vooruitzicht 81, Northern Cape Province. Report Prepared for Mystic Pearl. SRK Report No: 433862 August 2017).

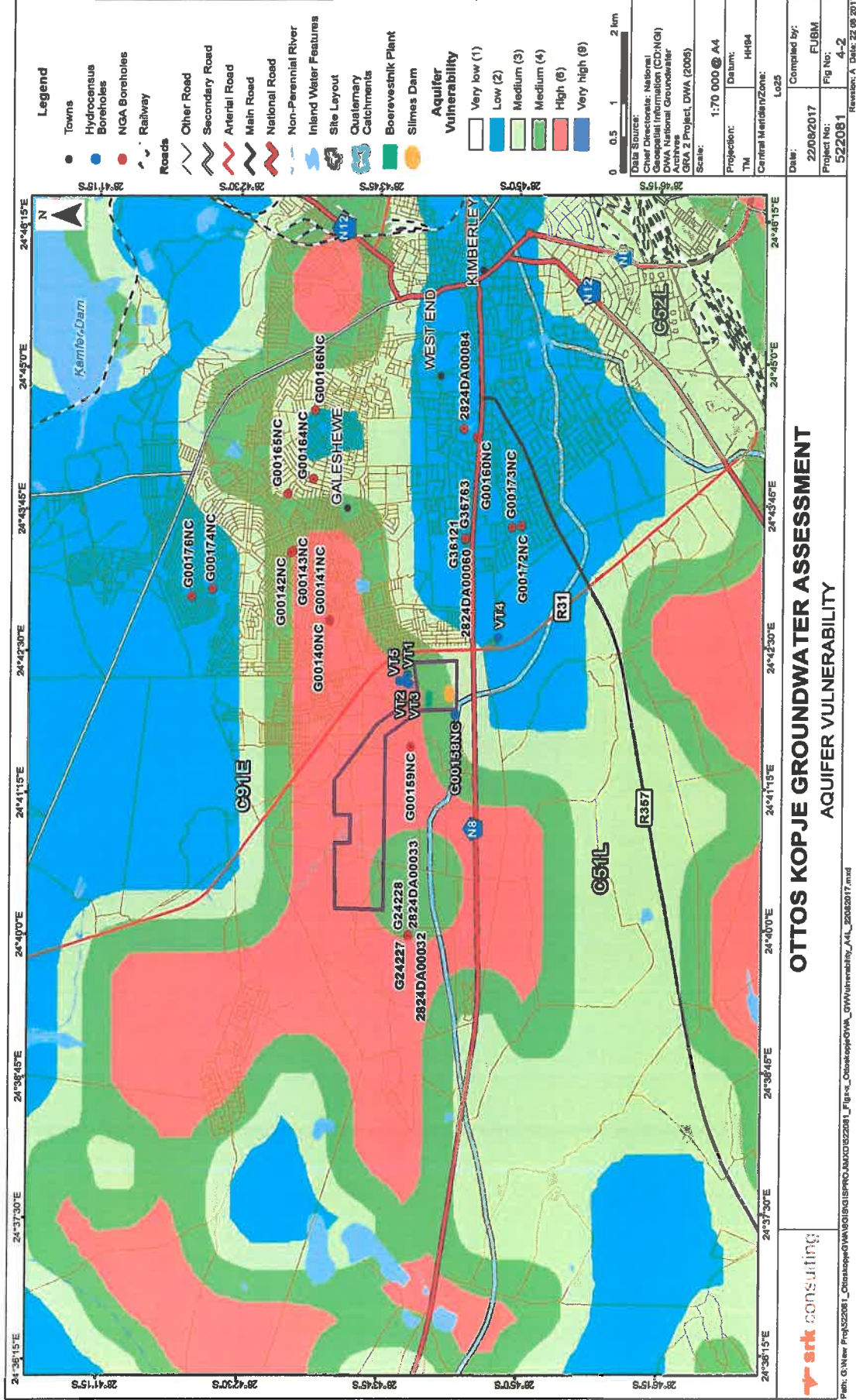


Figure 9. Aquifer Vulnerability out of the groundwater report by SRK Consulting.

(10) **AIR QUALITY AND NOISE:**

With reference to the Scheduled processes under the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965): No scheduled process relates to any proposed prospecting activity on the farm.

Existing sources

Current sources of impacts on air quality are the dust from unpaved gravel roads. Prospecting activities such as excavation and gravel roads from where the tar road end to the prospecting site will add impact on the environment.

The general air quality on the area is expected to be good.

New source

The source of air pollution on the area will be nuisance dust generated by the opencast bulk sampling process, the loading of gravels onto the transport trucks, the dumping of gravels over each sites primary screen or feeder bins as well as from the movement of trucks and vehicles on the prospecting roads. Gas emissions from machinery will be within legal limits.

Areas of impact

As the prevailing wind direction for the area is north to North West for the months January to September and changing from north to sometimes westerly winds during October to December, there is a potential for fall-out dust to impact on the surrounding properties – which can be described as the nearest potential area of impact. The dust management programme recommended should include daily dosing of access roads and stockpile areas if the bulk sampling stage is reached.

The dust is controlled by watering down the roadway used by these trucks while bulk sampling. The mineral processing is a wet process, thus no dust is generated.

A complain register for surrounding owners and the community will be kept on site and the management of dust would be guided by these additionally comments of public.

Noise

Existing sources:

Existing sources:

Noise on site will come from the large vehicles (tip trucks, front-end loader, back actor), from the working pan.

There are mining operations on both sides of the proposed prospecting operation. Although these operations do generate noise the overall impact can be described as negligible.

The impact would be of more importance regarding the direct worker environment that should adhere to the requirements in terms of the Mine Health and Safety Act. These noise levels will be continuous and the operators will be issued with earplugs.

Noise is normally encountered during the normal operation hours at the processing plant. Processing plant noise and mine vehicles are limited between 7am and 5pm every day during the week. Noise levels will be monitored on the Prospecting area and where necessary, protective equipment is used in certain areas where machinery is used.

(11) **VISUAL ASPECTS:**

The prospecting site can be visible from the R31 and N8. The negative visual impacts associated with open pits for the bulk sampling and the washing pan will however have a low negative impact since it will be visible to the landowners and can be visible from the R31 and N8. There is however no method of reducing the impact during bulk sampling operations (operational phase), it can only be mitigation by doing concurrent rehabilitation of open pits as prospecting progress.

(12) **BROAD-SCALE ECOLOGICAL PROCESSES:**

The Vooruitzicht project falls within the Savanna Biome as classified by Rutherford & Westfall (1994). Although this biome covers some 46% of the southern African, it is highly variable in its geology, climate and soil types, which results in great variation in the vegetation structure as well as in the fauna it supports. More specifically, the area under survey is described as Kimberley Thornveld complex which occurs across three provinces (Northern Cape, Free State and North West) at altitudes between 1 050 to 1 400 m.

This veld type is currently listed in the Least Threatened category indicating that it has no significant conservation threats at present. The vegetation structure typically consists of very well-developed tree layer with *Vachellia (Acacia) erioloba*, *V. (A.) tortilis*, *V. (A.) karroo* and *Boscia albitrunca*, as well as a closed shrub layer and occasional dense stands of *Tarchonanthus camphoratus* and *V. (A.) mellifera* where over-utilisation has stimulated bush thickening. *V. (A.) erioloba* is considered a keystone species as it maintains many other flora species which either grow in association with the trees, or faunal species which make use of the trees for food or shelter.

The proposed mine falls within close proximity to an urban development zone and has also not been identified as important for long-term maintenance of broad-scale ecological processes within the Sol Plaatje Municipality (Kotze et al. 2009). The mining operation itself is not expected to cause severe habitat transformation and due to the high degree of transformation through previous mining activities on site it is not expected to contribute to severe cumulative habitat loss or the disruption of the broad-scale landscape connectivity in the region. However, it is advisable that the prospecting activities are restricted to the earmarked application area.

(13) **SOCIO-ECONOMIC STRUCTURE OF THE REGION:**

(a) **Population Density, Growth and Location:-**

According to the 2011 Census, the population of Kimberley was 96,977, while the townships Galeshewe and Roodepan had populations of 107,920 and 20,263 respectively. This gives the urban area a total population of 225,160. Of this population, 63.1% identified themselves as “Black African”, 26.8% as “Coloured”, 8.0% as “White” and 1.2% as “Indian or Asian”. 43.2% of the population spoke Afrikaans as their first language, 35.8% spoke Setswana, 8.7% spoke English, 6.0% spoke isiXhosa and 2.7% spoke Sesotho.

Kimberley is the capital of the Northern Cape Province. It is located approximately 110km east of the confluence of the Vaal and Orange Rivers. The city has considerable historical significance due to its diamond mining past.

The Sol Plaatje Local Municipality comprises of a large urban node in the form of Kimberley, and villages and farms. Kimberley is the administrative centre of the municipality. The economic activities consist of retailers, industries as well as mining and farming.

The SPLM accommodates approximately 247 000 people and is also a major contributor to the economy of the Province accounting for 28.9% and 82.1% of provincial and District GDP in 2009 respectively, Sol Plaatje LM certainly is encumbered with ensuring that the Province as a whole reaches its accelerated growth objectives.

Table 9: Sol Plaatje Municipality: Population by Population Group

Persons	2001	1996	Change over 5 years		Annual ave % change	% Composition 2001
			Number	percent		
African	109,714	105,838	3,876	4%	0.7%	54%

Coloured	63,918	63,655	263	0%	0.1%	32%
Indian	1,612	1,809	-197	-11%	-2.3%	1%
White	26,220	29,587	-3,367	-11%	-2.4%	13%
Total Population	201,484	204,263	-2,799	-1%	-0.3%	100%

Gender	People	Percentage
Female	49 550	51.09%
Male	47 427	48.91%

Population Group	People	Percentage
Black African	40 218	41.47%
Coloured	35 590	36.70%
White	17 841	18.40%
Indian or Asian	2 226	2.30%
Other	1 102	1.14%

First Language	People	Percentage
Afrikaans	52 161	55.48%
Setswana	17 621	18.74%
English	14 626	15.56%
isiXhosa	4 328	4.60%
Sesotho	2 174	2.31%
isiZulu	901	0.96%
Other	836	0.89%
isiNdebele	418	0.44%
Sign Language	301	0.32%
Sepedi	275	0.29%
Tshivenda	175	0.19%
Xitsonga	153	0.16%
SiSwati	57	0.06%
Not Applicable	2 952	

(b) *Major Economic Activities and Sources of Employment:-*

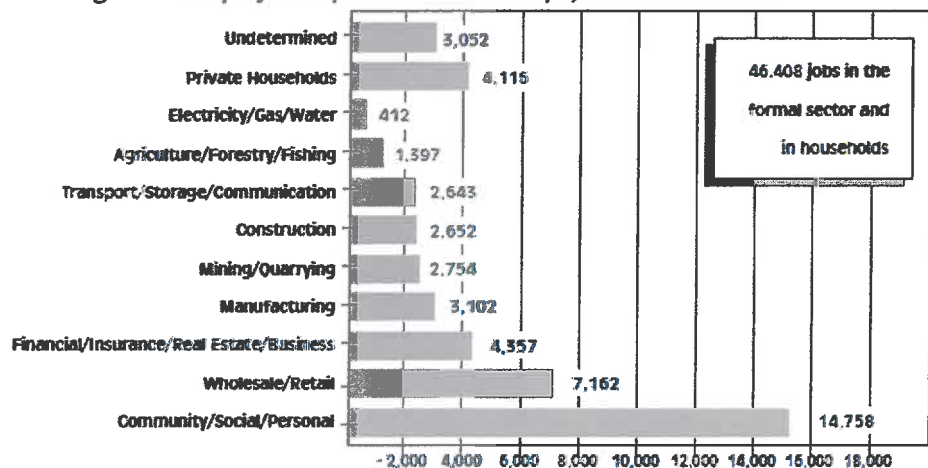
The population of Sol Plaatjie shows a declining trend – in common with the Northern Cape Province as a whole. One third of the employed citizens in Sol Plaatjie work for the public sector. The number of

economically active people barely grew between 1996 and 2001. However, the number of people with employment decreased, with the result that the rate of unemployment increased markedly, from 34% to 42%.

Persons	2001	1996	2001	1996	Change over 5 years	
			Percent	Percent	Number	Percent
Employed	46,412	51,643	58.5%	65.7%	-5,231	-10%
Unemployed	32,928	26,979	41.5%	34.3%	5,949	22%
Total Labour Force	79,340	78,622	100.0%	100.0%	718	1%
Not Economically Active	54,218	49,889			4,329	9%
Population 15 – 65	133,558	128,511			5,047	4%
Total Population	201,484	204,263			-2,799	-1%

In the past, the local economy of Sol Plaatjie was heavily dependent on the De Beers Diamond Mines in and near SPM. In addition, the military maintained large bases of men and equipment in and around the region. However, since the major mines, have downscaled and closed over the last 15 years and the military establishments have shrunk since 1994, the local economy has changed without diversifying. The public sector is the single largest source of employment, as the city is home to the regional and head offices of three spheres of government. The figure below illustrates that in 2001 the majority of the population were employed in the service sector.

Diagram 1: Employment pattern in Sol Plaatjie, 2001 Census Data



Other major employment areas are retail distribution and services. Tourism is a useful contributor to the economy, but it is not large enough to be defined as a driver of the economy in its own right. Employment in the manufacturing sector has experienced slow decline between 2000 and 2003.

Since the manufacturing sector is slowly losing the limited critical mass that it had, it no longer provides a viable economic sector for SPM on which to focus over the longer term within the ambit of a city

development strategy. With regard to other economic sectors, the following picture emerges:

- Mining is in closure mode within the city;
- Construction depends on government decisions;
- Retail is a driver of the local economy as the trading centre for the region;
- Tourism is a supporter of economic growth, but will rely on improved human capital;
- Transport depends on major state infrastructural investment in road and rail upgrading.

Table 10: Positive and negative forces in the economy

	Positive	Negative
Main Forces	Drivers of the economy Government (Provincial, District & Local) Retail and service economy for the city and the region	Underminers of the economy Decline of the mining and manufacturing sectors Growing strength of Sol Plaatje as the principal urban centre in the region
Important Supplements	Boosters The Diamond Hub Project The Urban Renewal Projects	Obstacles / Barriers Deteriorating state of the N12
	Complementers Tourism and tourism development Blue Train Appropriate improvers of the retail and recreation environment	Caps Capacity of the SPM as an institution to drive the strategic agenda Poor state of maintenance on municipal services Infrastructure supporting economic activity Loss of municipal tax revenue through decline of CBD
	Supporters De Beers “Big Hole” redevelopment – conference centre, hotel, museum Education institutions	Diversions Decentralised shopping malls
	Sustainers The N23 in its present poor state	
	Defenders Social grants	
Alternatives	Rescuers The new prison and mental facility Regional health facilities The N12 upgraded The military Relocation of a national department to Sol Plaatje	

(c) Estimated Unemployment:-

The education level of persons in the area where only 10% have post-matric and 90% matric or less with an unemployment rate of 33% which

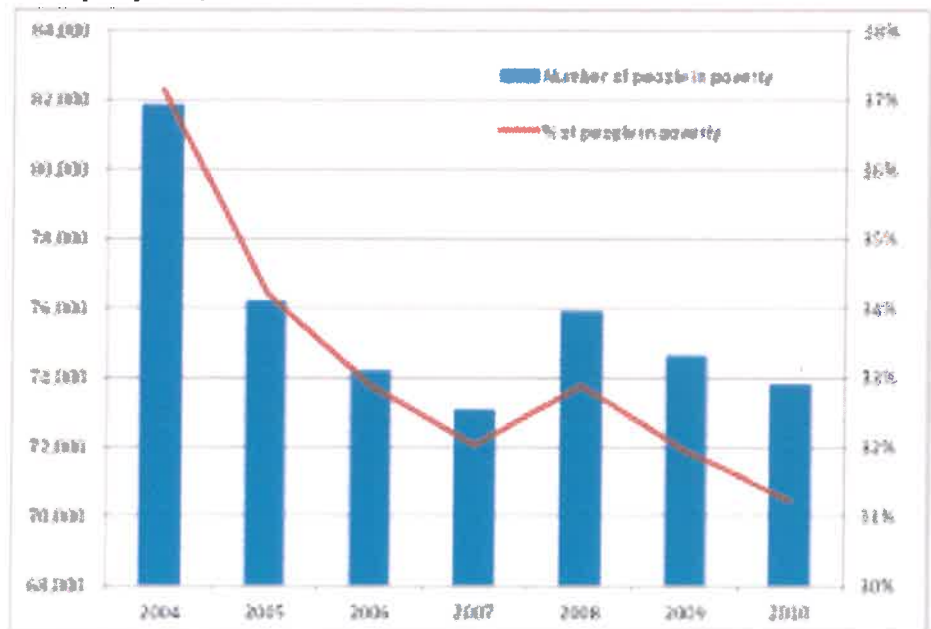
is mainly in the category of persons with matric or less, a need exist for innovative ways to diversify the economy. The main job creating sectors are the primary and secondary sectors which employ the most unskilled workers.

Table 11: Labour Market and Education Statistics 2011 compared to 2001

Labour Market				Education (aged 20+)					
Unemployment Rate (official)		Youth Unemployment Rate (official) 15 – 34 years		No Schooling		Matric		Higher Education	
2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
41,3%	31,9%	51,5%	41,7%	11,3%	7,1%	21,9%	29,2%	8,7%	10,4%

Linked to the unemployment rate the chart below indicates the people living in poverty in the Sol Plaatjie Municipality.

Chart 1: Number and percentage of people livening in poverty, Sol Plaatjie Local Municipality 2004 – 2010



According to the chart above the number of people living in poverty decreased dramatically to 31,2%. This is well below the national average of 39,9% as well as the provincial and district averages of 43,4% and 39,1% respectively. The NDP’s target is to reduce the number of people living in poverty to 39% by 2030.

(d) Housing Demand and Availability:-

Table 12: Access to Household Services (higher level) 2011 compared to 2001

Level of Service	2001 %	2011 %
Piped water inside dwelling	51,2	61,9
Flush toilet connected to sewer	83,4	82,8
Electricity for lighting	82,4	84,9
Weekly refuse removal	90,8	84,3

SPM was able to provide more households with a higher standard of service in terms of water and electricity during the period 2001 to 2011 which was however not the case with sanitation and refuse removal. In the case of sanitation the main reason is that until 2009/10 SPM's bulk sewer treatment works ran out of capacity which led to a moratorium on development as new development – also housing development – could not be connected to the sewer network. The capacity problems have since been resolved and the moratorium has been lifted and enough capacity has been created for the next 20 years. Refuse removal also lagged behind mainly due to the increase of informal settlements – which is not accessible to deliver a waste removal service. This is still the case today.

The infrastructure diamond below depicts the four household infrastructure measures on a single diamond shaped chart. The larger the diamond, the better serviced the area is in terms of refuse removal, electricity, water and sanitation access. The dotted blue line shows the national average as a means of comparison, the light dotted blue line is the provincial comparison, whilst the green line shows the SPM's measure. The dotted blue line falls inside the green line indicating that SPM is performing better than the national and provincial average.

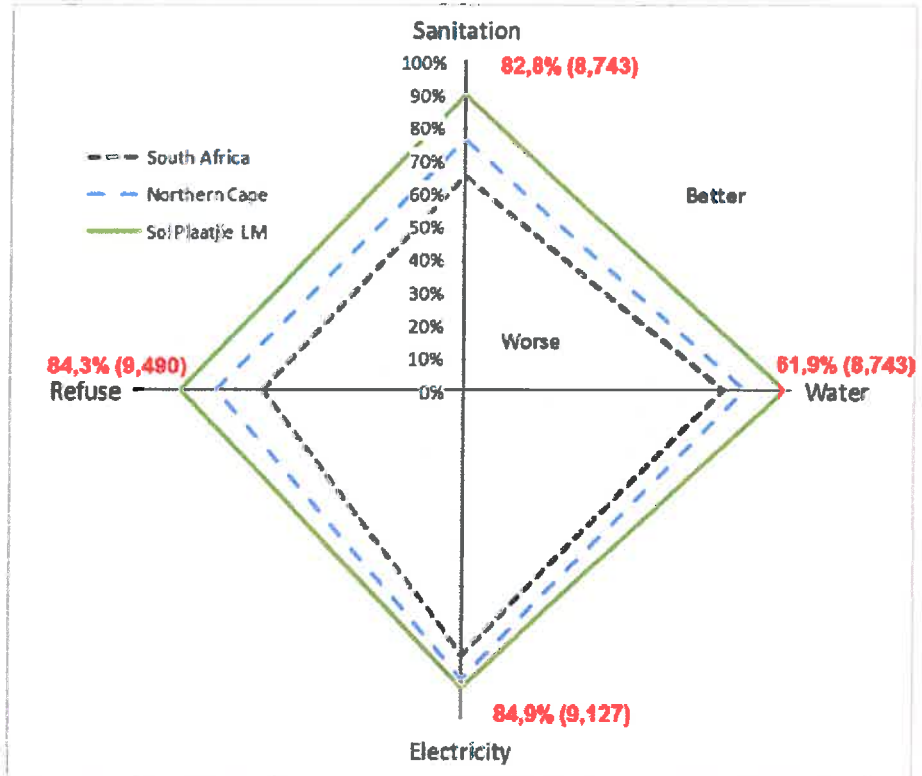


Figure 10: SPM Infrastructure Diamond: Basic Services: 2011

Although SPM does well in providing services to its communities the tables below indicate the backlogs and needs that still exist in terms of service delivery.

The table below indicate the number of informal settlements in SPM as well as the stage of development in each informal settlement.

Table 13: No. and Status of Informal Settlements

Description	No. of Areas	H/H
Planning not commenced	9	5 172
Planning in process	11	2 167
Planning completed – await registration	5	1 526
Install services	2	996
Housing	1	3 500
TOTAL	28	13 361

Table 14 below indicates the present backlogs/need for basic household services according to Census 2011, the provision of services since the 2012/2013 financial year as well as the planned provision for the financial

year 2014/2015. It also include the growth of informal households since the 2011 Census and the survey done through the NUSP process.

Table 14: Basic Household Services Backlog and Need 2011

Service	Backlog Census 2011	Provision up to 30 Jun 2014	2014/2015 Targets	TOTAL	Balance	PLUS Growth 2011 to 2013
New Houses (subsidised)	7 846	1 293	375	1 668	6 178	11 693
New Erven Planned and Surveyed	7 846	1 163	1 272	2 435	5 411	10 927
Houses connected to water	8 743	2 521	892	3 413	5 330	10 846
Houses connected to sanitation	9 343	3 552	892	4 444	4 899	10 415
Houses connected to electricity	9 127	2 335	214	2 549	6 578	12 094
Houses provided with waste removal	9 490	2 000	600	2 600	6 890	12 406
Roads Rehabilitation/ Paving	297km	25,7km	2,5km	31,7km	265,3km	-

(e) Social Infrastructure:-

The city of Kimberley have formal instructure such as schools, university, hospitals, sport- and recreation facilities and shops.

(f) Water Supply:-

Water is available to almost 50% of the population in the Northern Cape in the form of water piped to their dwelling. The next most used source of water supply is piped water on-site or in yards, which is available to around 33% of the population.

Surface water from the Riet-, Vaal- and Orange River is the major source of water in the region, although some smaller communities are totally dependent on groundwater for supply.

(14) **SENSITIVE LANDSCAPES:**

In addition, one potentially sensitive site (apart from the already-mentioned water bodies in the area) was also identified near to the Vooruitzigt site. Just to the northeast of the site is a long stand of exotic gum trees *Eucalyptus* sp. These trees that may potentially provide roosting opportunities for protected migrating kestrel species during the summer months. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum).

(15) **ARCHAEOLOGICAL**

Mr. Edward Matenga from (AHS) Archaeological and Heritage Services Africa (Pty) Ltd has been appointed by Mystic Pearl to provide an Heritage Impact Assessment **Annexure C** in order to highlight the Heritage of the proposed prospecting area, and to determine the possible impact of prospecting on the Heritage of the application area.

Findings of the HIA survey

A western portion of the property bears scars of excavations of varying depths which are ongoing in some areas. From an archaeological standpoint, the area is considered as disturbed and no archaeological provenances pre-dating the city can be expected to have survived the impact of these activities. Furthermore there are no elements of heritage value relating to the development of the city.

With respect to the eastern portion of the property close to the intersection of the N8 and R31, and located opposite to a section of Galeshewe Township, no archaeological relics were found. The only sign of human activity is degraded vegetation and pedestrian pathways to the farms and dumping site located to the west and northwest of the property.

Two mounds (Sites P9 & P10) which form the eastern ends of parallel ridges appear to be a mixture of household refuse and/or industrial discard perhaps dating back more than 60 years. Although the rating for heritage value is low, material / artefacts found therein might be of relevance in the fields of historical archaeology / industrial archaeology. However these two disciplines have not yet been formally introduced in universities or heritage museums in the country. The mounds therefore do not warrant protection in terms of this impact evaluation,

suffice it to mention an opportunity that can be pursued in the future. PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE, May 2017 by Edward Matenga (MPhil, Archaeology; PhD Archaeology & Heritage, Uppsala/Sweden))

In the event that the prospecting operation does not proceed, the heritage resources will remain as is. The protection and preservation of these resources are therefore not guaranteed. However, if the prospecting operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off if any of these resources are encountered.

Palaeontology

The proposed activity entails excavating 50 test trenches. It is estimated that an average 3m depth of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2 – 4m) which is host to the diamonds. The trenches will be 25m x 15m x 0.5 – 7m deep. A palaeontological assessment is necessary as these superficial levels might contain fossils in view of the known palaeontological sensitivity of the area.

The rock units underlying the area of the proposed development have been identified from the 1: 250 000 geology map 2824 Kimberley (Council for Geosciences, Pretoria), scientific literature and previous palaeontological impact assessments that have been conducted in the broader area. The following is a summary of the findings:

The Allanridge Formation andesite lavas belong to the Ventersdorp Supergroup (VSG) which date back to the Precambrian 2600 MYA. The Ventersdorp Supergroup represents a major episode of igneous extrusion, what is termed a Large Igneous Province (LIP) from below the Kaapvaal Craton some 2.7 Ga (billion years) ago. The Allanridge Formation of igneous lavas are considered to be unfossiliferous.

The Dwyka Group forms the lowermost and oldest deposit in the Karoo Supergroup basin. Northwest of Kimberley the rocks in this group exhibit glacial pavements - glacially-striated and eroded bedrocks – of Permo-Carboniferous age, (c. 300 Ma) that tend to overlie the Allanridge Formation outcrop area in the same region. The Dwyka tillite is mostly a very fine-grained, blue-grey rock comprised of clay / mud

matrix with inclusions (or clasts) of many other fragments picked up by glaciers during their travels. The paleontological rating of the glacial tillites of the Dwyka Group are considered to be medium to low.

The Ecca group is a subcomponent of the Karoo Supergroup, a sedimentary complex post-dating Dwyka in which principally shales and sandstones were laid down in the sandy shorelines of swamplands during the Permian Period. The Ecca fossil marine deposition may contain marine invertebrates (esp. molluscs, brachiopods), coprolites, palaeoniscoid fish & sharks. There are also traces fossils, various microfossils, petrified wood. The palaeontological rating according to Almond (2012) is high.

The Karoo dolerite of the Drakensberg Group sill underlies most of the area in the Kimberley municipal area. It represents an intrusion of igneous lavas between 183.0 to 182.3 MYA. Dwyka shales lying immediately below the dolerite sheet have usually been metamorphosed to lydianite and homstone as a result of exposure to intense heat during the intrusion event, with a possibility of destroying fossil materials in the upper layers of these sediments. The Karoo dolerite (igneous lavas) are considered to be unfossiliferous.

Large areas of unconsolidated, reddish-brown to grey aeolian (i.e. wind-blown) sands of the Quaternary Gordonia Formation (Kalahari Group) have been observed on the western outskirts of Kimberley and at the Farm Vooruitzigt 81 and Fieldsview north of the city. Immediately below the sands may be a calcretic layer or pedogenic limestones generally considered of the same geological period. They are considered of low sensitivity with the possibility of finding calcretised rhizoliths & termitaria, ostrich egg shells, land snail shells, rare mammalian and reptile (e.g. tortoise) bones, teeth freshwater units associated with diatoms, molluscs, stromatolites etc.

Although the impact of the proposed development on fossil resources is expected to be minimal, it is still recommended that the Environmental Control Officer (Eco) put in place a contingency plan to rescue chance finds and where possible preserve them in situ. A standard Fossil Finds Procedure (FFP) is appended to this report to provide field guidance to the ECO. The recommendations made here should also be incorporated into the Environmental Management Plan for the proposed mining operations. (PALAEONTOLOGICAL SPECIALIST ASSESSMENT (DESKTOP) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE

May 2017 Prepared by Joseph Chikumbirike (PhD Palaeontology, University of the Witwatersrand).

Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the prospecting operation is approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

(b) Description of the current land uses

(1) *Land Use before Prospecting :*

Currently, the major land uses in the area are activities related to urbanisation, such as municipal waste facilities, residential buildings and commercial properties. According to AGIS, the land capability for the study site is non-arable with moderate potential grazing land. The grazing capacity is between 9 and 13 ha/AU, with the agricultural region being demarcated for cattle farming. The area is categorised to have no suitability for crop production.

Vooruitzigt is mainly used for the current KIMCRUSH operation, but hunting dogs were seen crossing the property during the site visit. This could suggest that illegal hunting of resident wildlife occurs here. The property does not seem to be fenced-off in the north and west and therefore reasonably accessible from these directions.

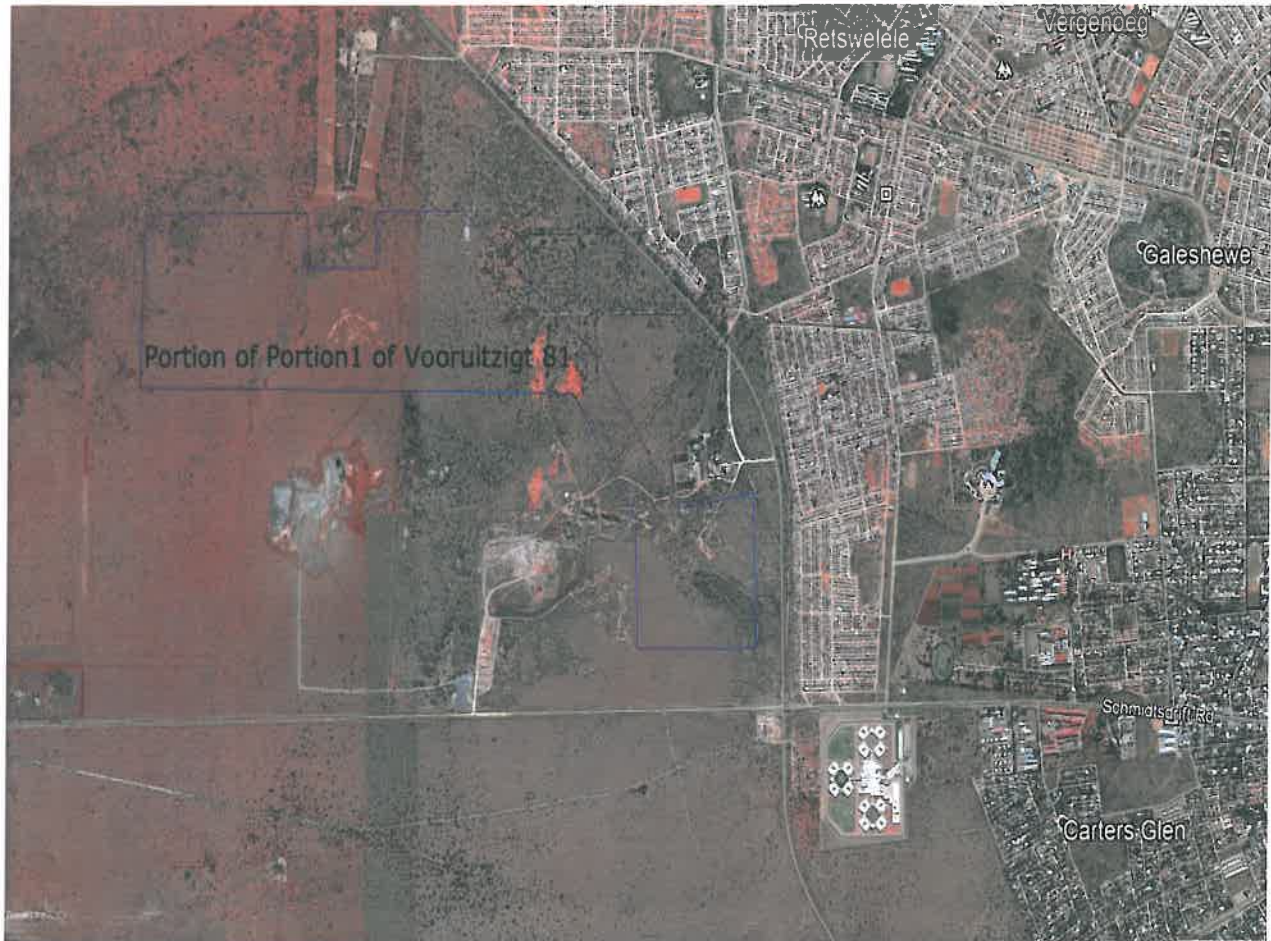


Figure 11. Evidence of the land use history on Vooruitzicht (map out of Ground water study by SRK).

(2) Evidence of Disturbance:-

Currently, due to historical disturbances at the Vooruitzicht project site as well as the current illegal wood-gathering activities, the area in general has been denuded of larger tree structures. The browsing and grazing activities of local livestock have also impacted on the vegetational structure and some areas show significant trampling. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzicht 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum).

(3) Existing Structures:-

The Vooruitzicht project site as indicated by the developers will be 254 ha in extent. To the northwest is the SANDF military rifle range and the San community on the farm Platfontein that was relocated from

Schmidtsdrift in the 1990s. Directly north is the unoccupied farm Wildebeeskuil. Adjacent to the entire eastern side of the project site is the township area of Galeshewe that forms the western parts of Kimberley. To the western side are the municipal refuse dumping areas and the John West Airfield.

Whilst there are no formal public access roads, the area is crisscrossed by unmaintained dirt roads and pathways.

The area is undeveloped but previously disturbed by large-scale and unrehabilitated mining activities (particularly in the southeastern areas of the proposed area), public fly-tipping and illegal waste dumping as well as poaching, firewood collection and illegal grazing activities by local adjacent communities. There are no fully maintained fencing structures or excluded areas currently. (Ecological specialist study for the proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt 81 & concurrent development of Otto's Kopje diamond mine, Kimberley district, Northern Cape Province, AUGUST 2017, Beryl Wilson, Zoologist & Conservation Biologist, McGregor Museum).

(c) Description of specific environmental features and infrastructure on the site

The infrastructure on site is comprehensively discussed in section d(ii) as part of the prospecting methodology discussion, as well as in section g as part of the prospecting footprint description. Furthermore, a comprehensive description of the environment was presented in section g (iv) (A) as part of the baseline report.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

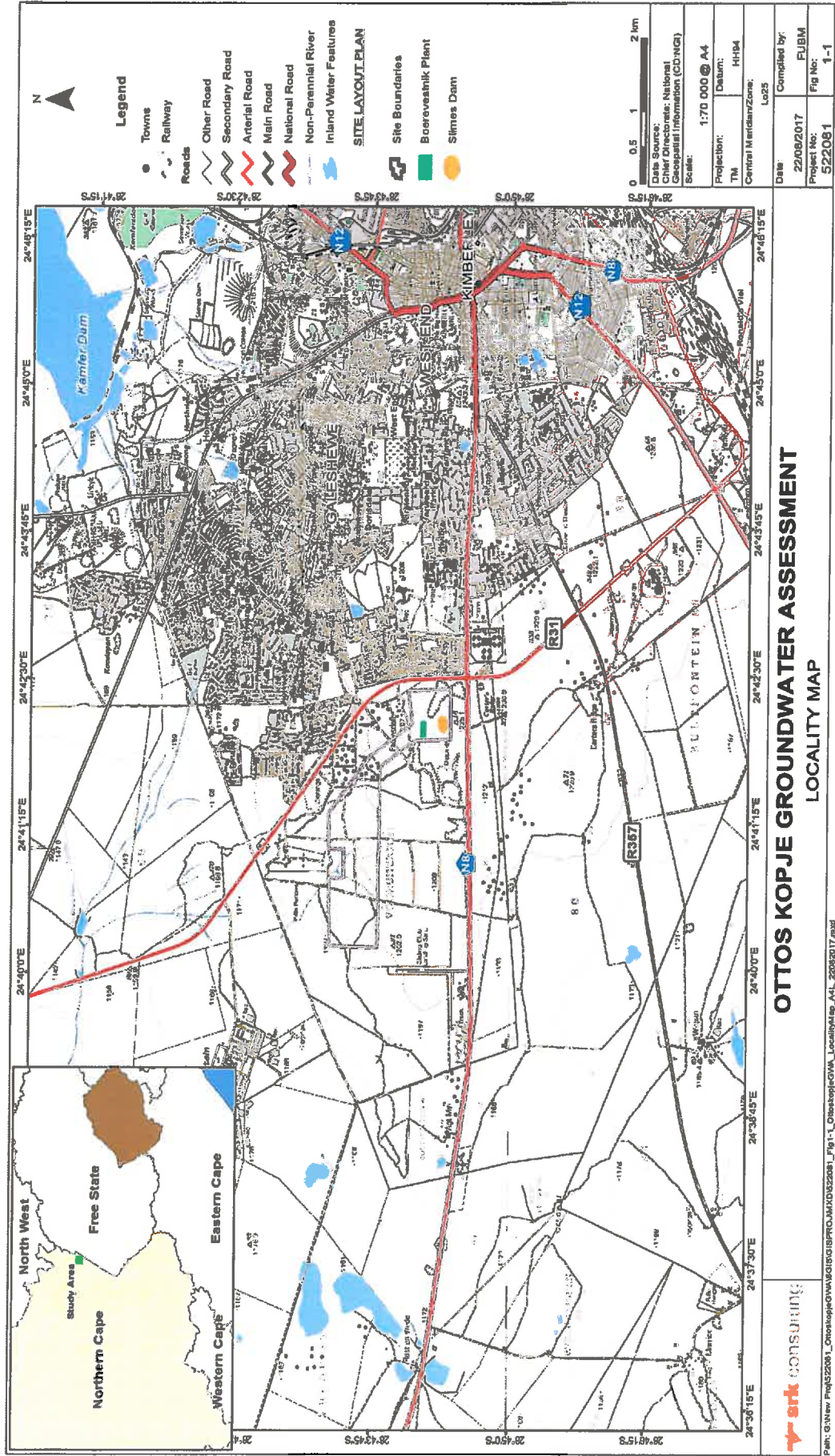


Figure 12. Environmental and current land use map out of ground water study by SRK Consulting

DRAFT

v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated)

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
PHYSICAL						
Geology and Mineral Resource	Sterilisation of mineral resources	Very low	Highly unlikely	Operational and Decommissioning	insignificant Local	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and residue deposits.	Medium	High	Construction and Operational	Low Local	<ul style="list-style-type: none"> Prospecting of all alluvial gravels continuously, if possible and does not influence prospecting and safety requirements. Employ effective rehabilitation strategies to restore surface topography of bulk samples, pits, dumps and plant site. Stabilise the mine residue deposits (Tailings dump). All temporary infrastructures should be demolished during closure.
Soils	Soil Erosion Infrastructure; bulk samples, pits.	Medium-high	Certain	Decommissioning	Medium-high Regional	<ul style="list-style-type: none"> Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.

						<ul style="list-style-type: none">• Ground exposure should be minimised in terms of the surface area and duration, wherever possible.• Construction /excavation during the rainy season (November to March) should be monitored and controlled. Diversions during potential flooding should also be managed.• Run-off from exposed ground should be controlled with flow retarding barriers.• All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.• Stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.• Audits must be carried out at regular intervals to identify areas where erosion is occurring.• Linear infrastructure such as
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	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
<p>Loss of soil fertility During the removal of topsoil; stockpiling.</p>	<p>Low-Medium</p>	<p>Possible</p>	<p>Residual</p>	<p>Low-medium Local</p>	<ul style="list-style-type: none"> Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. Topsoil stockpiles must be kept separate from sub-soils. The topsoil should be replaced as soon as possible onto the cleared areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. 	
<p>Soil pollution Spillage of hazardous material; runoff.</p>	<p>Medium</p>	<p>Medium</p>	<p>Construction and Operational</p>	<p>Low Local</p>	<ul style="list-style-type: none"> Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental 	

								<p>spills from earthmoving machinery must be well-marked and available on site.</p> <ul style="list-style-type: none"> Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.
Land Capability	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Very Low	Possible	Short term		Minimal Local	Employ appropriate rehabilitation strategies to restore land capability.	
Land use	Loss of land use due to poor placement of infrastructure and ineffective rehabilitation	Very low	Possible	Short term		Minimal Local	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.	
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration		Consequence Extent	Management / mitigation	
	Hydrocarbon Spills from construction vehicles and fuel storage areas may contaminate the groundwater	Low	Possible	Construction		Low Local	Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response. Each area where hydrocarbons are stored or likely to spill should	

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
resource locally						be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Surface Water	<p>Nature of Impact</p> <ul style="list-style-type: none"> • Ground works and stripping of vegetation resulting in a changed land profile. • Runoff from stockpiled soil and vegetation may contain high levels of silt. • Transport of construction materials to and from site. Significant levels of dust may emanate from the use of heavy construction vehicles which in turn will impact on runoff water quality. • Materials used during 	Medium to Low	Possible	Construction	Low Local	<p>Water Quality deterioration: change in water quality is caused by a change in natural conditions and/or an enhancement of pollution from sources.</p> <p>Mitigation measures (or safety precautions) that are taken in order to eliminate any risk the project area could have on the natural, cultural and social environment of the concerned area and that must be implemented during the different phases i.e. construction, operational and post closure to minimize the impacts are as follows:</p> <ul style="list-style-type: none"> • Only environmental friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources. • Pipe leakages should be minimized.

	<p>construction may impact negatively on the runoff water quality.</p> <ul style="list-style-type: none"> Spillages that may occur on access and haul roads may impact negatively on surface water quality. This issue is dealt with in the EMP. A high potential of soil erosion exists due to an increased percentage of bare surfaces. Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution. Removal of vegetation could lead to erosion and sediment 	<p>High</p>	<p>Possible</p>	<p>Operational</p>	<p>Low Moderate Local</p>	<ul style="list-style-type: none"> Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment. Non mining waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area. The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.
		<p>Moderate to High</p>	<p>Possible</p>	<p>Closure</p>	<p>Low Local</p>	

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
<p>Indigenous Flora</p>	<p>transportation.</p> <ul style="list-style-type: none"> Significant dust levels will emanate from the use of heavy construction vehicles. <p>Loss of and disturbance to indigenous vegetation</p> <p>Construction of roads, plant site, as well as other necessary infrastructure; placement of stockpiles; and the clearing of vegetation for prospecting, materials storage and topsoil stockpiles; vehicular movement.</p> <p>Loss of flora with conservation concern</p> <p>Removal of listed or</p>	<p>Low to medium</p>	<p>Certain</p>	<p>Life of Operation</p>	<p>Low to Medium Local</p>	<ul style="list-style-type: none"> Minimise the footprint of transformation. Encourage proper rehabilitation of prospected areas. Encourage the growth of natural plant species. Ensure measures for the adherence to the speed limit.
	<p>Loss of flora with conservation concern</p> <p>Removal of listed or</p>	<p>Low to medium</p>	<p>Possible</p>	<p>Life of Operation</p>	<p>Low to Medium Local</p>	<ul style="list-style-type: none"> Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting.

	<p>protected plant species; during Construction of new roads and other necessary infrastructure, the placement of stockpiles; and clearing of vegetation for bulks samples and pits.</p>				<ul style="list-style-type: none"> • It is recommended that these plants are identified and marked prior to prospecting. • These plants should, where possible, be incorporated into the design layout and left in situ. • However, if threatened of destruction by prospecting, these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental induction prior to commencing with work on site. The environmental
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						induction should occur in the appropriate languages for the workers who may require translation. <ul style="list-style-type: none"> All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
Proliferation of alien vegetation Clearing of vegetation; prospecting activities	Low-Medium	Possible	Residual	Medium High Local	<ul style="list-style-type: none"> Minimise the footprint of transformation. Encourage proper rehabilitation of prospected areas. Encourage the growth of natural plant species. Mechanical methods (hand pulling) of control to be implemented extensively. Annual follow-up operations to be implemented. 	
Encouragement of bush encroachment Clearing of vegetation; disturbance through prospecting activities.	Low-Medium	Possible	Residual	Low-medium Local	<ul style="list-style-type: none"> Minimise the footprint of transformation. Encourage proper rehabilitation of prospected areas. Encourage the growth of natural plant species. Mechanical methods (hand pulling) of control to be implemented extensively. Annual follow-up operations 	

Fauna	Loss, damage and fragmentation of natural habitats Clearance of vegetation; prospecting activities	Low-Medium	Certain	Decommissioning	Low-Medium Local	to be implemented.
<ul style="list-style-type: none"> Prospecting activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no go zone for employees, machinery or even visitors Employ sound rehabilitation measures to restore the characteristics of the affected aquatic and riparian habitats. 						
<ul style="list-style-type: none"> Careful consideration is required when planning the placement for stockpiling 						

	<p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p>				<p>topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.</p> <ul style="list-style-type: none"> • The extent of the proposed mine should be demarcated on site layout plans, and no construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. • The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. • All those working on site must undergo environmental induction with regards to fauna and in particular
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						<p>awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.</p> <ul style="list-style-type: none"> All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. If any mortalities resulting from prospecting occur, it should be recorded with the date of the observation, the species affected and any other relevant information. Employ measures that ensure adherence to the speed limit.
<p>Air Quality</p>	<p>Sources of atmospheric emission associated with the prospecting</p>	<p>Low</p>	<p>Certain</p>	<p>Decommissioning</p>	<p>Low Local</p>	<p>Effective soil management; identification of the required control efficiencies in order to maintain dust generation within</p>

SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
	operation are likely to include fugitive dust from materials handling operations, wind erosion of stockpiles, and vehicle entrainment of road dust.					acceptable levels.
Noise Impacts	Clearing of footprint areas, stripping of stockpiling of topsoil	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Topsoil stripping should be limited to daytime only.
	Noise increase at the boundary of the mine footprint.					
	Construction of Roads	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Building activities	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Building activities at the mine foot print and along the conveyer belt should be limited to daytime only.
	Noise increase at the boundary of the mine footprint.					
	Hauling of building material to and from	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply

	<p>the specific areas.</p> <p>Noise increase at the boundary of the mine footprint</p>	<p>Medium</p>	<p>Possible</p>	<p>Pre- Construction and Construction</p>	<p>Low Local</p>	<p>with the manufacturers specifications on acceptable noise levels Hauling of material should be limited to daytime only. Noise survey to be carried out to monitor the noise levels during these activities. Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.</p>
<p>Construction of the Mine Residue dump, soil stock pile and material stock pile.</p> <p>Noise increase at the boundary of the mine footprint.</p>	<p>Medium</p>	<p>Possible</p>	<p>Operational</p>	<p>Low Local</p>	<p>Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Topsoil stripping should be limited to daytime only.</p>	
<p>Clearing of new cast open prospecting areas, stripping and stockpiling of topsoil.</p> <p>Noise increase at the boundary of the mine footprint.</p>	<p>Medium</p>	<p>Possible</p>	<p>Operational closure</p>	<p>Low Local</p>	<p>Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.</p>	
<p>Diesel generators Noise increase at the boundary of the mine footprint.</p>	<p>Medium</p>	<p>Possible</p>				

Additional traffic to and from the mine	Medium	Possible	Operational closure	Low Local	these activities. Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
Prospecting activities	Medium	Possible	Operational closure	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
Maintenance activities at the site.	Medium	Possible	Operational closure	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
Back fill of mine footprint area Noise increase at the boundary of the mine footprint and at the residents living close.	Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities. Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Backfill of mine footprint area activities should be limited to daytime only.

	Planting of grass and vegetation at the rehabilitated areas	Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Planting of grass and/or vegetation should be limited to daytime only
	Removal of infra-structure	Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Removal of infrastructure should be limited to daytime only. Noise survey to be carried out to monitor the noise levels during these activities.
Visual impacts	Potential visual impact	Medium	Certain	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low, Correct design will ensure that the development will fit into the surrounding area and will become a feature of the area.
	Potential Visual Impact on the surrounding land users/ residents	Medium Regional	Highly Likely	Construction, Operation and Decommissioning	Medium Local Site	The design of the proposed prospecting development will determine the visual impact.
	Potential visual impact of proposed	Medium Regional	Highly Likely	Construction	Low Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a

	<p>development on the construction phase of the surrounding land users in close proximity</p>				<p>negative visual impact.</p> <ul style="list-style-type: none"> • Ensure that the design fits into the surrounding environment and it is aesthetically pleasing; • Reduce the construction period through careful planning and productive implementation of resources; • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads; • Ensure that rubble, litter and disused construction materials are managed and removed regularly; • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; • Reduce and control construction dust emitting activities through the use of approved dust suppression techniques; and
<p>Potential impact of proposed development on the operational phase of the surrounding land</p>	<p>Medium Regional</p>	<p>Highly likely</p>	<p>Operational</p>	<p>Medium Local Site</p>	<p>Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact.</p> <ul style="list-style-type: none"> • Ensure that the design fits

	users in close proximity.					into the surrounding environment and it is aesthetically pleasing. <ul style="list-style-type: none"> • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way; • Rehabilitation of disturbed areas and re-establishment of vegetation;
Traffic	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Low likelihood	Decommissioning	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	Population Impacts Employment Opportunities and skills Inequities	Medium Positive	Probable	Start-up and Construction	Medium Positive Local	<ul style="list-style-type: none"> • A community skills audit should be undertaken by Mystic Pearl. Alternatively, the existing Sol Plaatje Labour Desk could be used to determine which skills are locally available and which employees could come into consideration for employment. • Training of potential future employees, contract workers and/or community members should focus on mining related skills which would

					<p>furthermore equip trainees/beneficiaries with the necessary portable skills to find employment at the available employment sectors within the study area. Multi-skilling is thus not necessarily the preferred training and skills development method.</p> <ul style="list-style-type: none"> • Training of local construction workers during the construction phase to enable them to be employable during the operational phase would not stop the influx of outsiders, but could attempt to minimise the number of “new” outsiders coming to the area in search of employment. • Training courses should be accredited and certificates obtained should be acceptable by other related industries. • Guidance concerning legal requirements to which locals should adhere to, to make them employable, such as the standard construction industry requirements should also be attended to.
	Safety and Security	Low	Highly	Construction	<ul style="list-style-type: none"> • A
				Low Negative	Fire/Emergency

Risks	Negative	Probable		Local	Management Plan should be developed and implemented at the outset of the construction phase.
Health Impacts	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> • Open fires for cooking and related purposes should not be allowed on site. • Appropriate firefighting equipment should be on site and construction workers should be appropriately trained for fire fighting • The construction area should be fenced or access to the area should be controlled to avoid animals or people entering the area without authorisation. • Speeding of construction vehicles must be strictly monitored • Local procurement and job creation should receive preference. • Maximise the employment of locals where possible • First aid supplies should be available at various points at the construction site • Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in

Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the prospecting applicant.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	<p>and nearby the construction site</p> <ul style="list-style-type: none"> The general health of construction workers should be monitored on an on-going basis 	<p>Ensure continuous and transparent communication with IAP's</p>
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- vi) **Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks**(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

Methodology used in determining and ranking the nature, severity, consequences, extent, duration and probability of potential environmental impacts and risks

The Different environmental components on which the project (can) have an impact are:

1. **Geology**
2. **Topography**
3. **Soil**
4. **Land Capability**
5. **Land Use**
6. **Flora (Vegetation)**
7. **Fauna**
8. **Surface Water**
9. **Ground Water**
10. **Air Quality**
11. **Noise and vibration**
12. **Archaeological and Cultural Sites**
13. **Sensitive Landscapes**
14. **Visual Aspects**
15. **Socio-Economic Structures**
16. **Interested and Affected Parties**

Impact Assessment

Before the impact assessment could be done the different project Activities/infrastructure components were identified.

1	Processing Plant : 1 X 16 feet Processing plant: 1 X 16 feet pan with conveyers and recovery
2	Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
3	Clean & Dirty water system: Berms It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.
4	Fuel Storage facility (Concrete Bund walls and Diesel tanks): It is anticipated that the operation will utilize 2 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.
5	Prospecting Area : Bulk sampling and pitting for alluvial diamonds.
6	Salvage yard (Storage and laydown area).
7	Product Stockpile area.
8	Waste disposal site The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: <ul style="list-style-type: none"> o Small amounts of low level hazardous waste in suitable receptacles; o Domestic waste; o Industrial waste.
9	Roads (both access and haulage road on the mine site): Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the prospecting operation will create an additional 2 - 4 km of roads, with a width of 6-15 meters.
10	Temporary Workshop Facilities and Wash bay.
11	Water distribution Pipeline.
12	Water tank : It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

The criteria used to assess the significance of the impacts are shown in the table 15 below/overleaf. The limits were defined in relation to prospecting characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb and experience. Natural and existing mitigation measures were considered.

These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

(Severity + Extent + Duration) x Probability weighting

For the impact assessment, the different project activities and associated infrastructure were identified and considered in order to identify and analyse the various possible impacts.

Table 15: Significance of impacts is defined as follows.

SIGNIFICANCE				
Colour Code	Significance rating	Rating	Negative Impact	Positive Impact
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive
	Medium-Low	23 -33	Acceptable/Not desirable	Moderately Positive
	Medium	34 - 48	Generally undesirable	Beneficial
	Medium-High	49 - 56	Generally unacceptable	Important
	High	57 - 70	Not Acceptable	Important
	Very High	90 - 102	Totally unacceptable	Critically Important

Significance of impacts is defined as follows:

Very Low - Impact would be negligible. Almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple.

Low - Impact would have little real effect. Mitigation and/or remedial activity would be either easily achieved or little would be required or both.

Medium Low- Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and fairly easily possible.

Medium - Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be feasible and possible.

Medium High- Impact would be real but could be substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and possible but may be difficult and or costly.

High - Impacts of substantial order. Mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these.

Before any assessment can be made the following evaluation criteria need to be described.

Table 16: Explanation of PROBABILITY of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Improbable	<20% sure of particular fact or likelihood of impact occurring
2	Low Probability Possible	20 – 39% sure of particular fact or likelihood of impact occurring
3	Probable /Likely	40 – 65% sure of particular fact or likelihood of impact occurring
4	Highly Probable /Likely	66 – 85% sure of particular fact or likelihood of impact occurring
5	Definite	86% - 100% sure of particular fact or likelihood of impact occurring

Table 17: Explanation of EXTENT of impact

Weight	Extent of Impact	Explanation of Extent
1	Footprint	Direct and Indirect impacts limited to the activity, such as footprint occurring within the total site area of impact only.
2	Surrounding Area Site	Direct and Indirect impacts affecting environmental elements within 2 km of site
3	Local Municipality Local	Direct and Indirect impacts affecting environmental elements within the Sol Plaatje area
4	Regional/District Regional	Direct and Indirect impacts affecting environmental elements within District (Kimberley District)
5	Provincial	Direct and Indirect impacts affecting environmental elements in the Northern Cape Province

Table 18: Explanation of DURATION of impact

Weight	Duration of Impact	Explanation of Duration
1	Temporary (Very Short)	Less than 1 year
2	Short term	1 to 5 years
3	Medium term	6 to 15 years
4	Long term (Life of project)	16 to 50 years
5	Very Long term	Longer than 50 years
6	Permanent	Permanent

Table 19: Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
3	Low	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
4	Moderately Severe	Impact would be real but not substantial within the bounds of

		those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means other means of covering these benefits would be about equal in cost and effort.
5	High Severance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
6	Very High Severity	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit.

vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

During the operational stages of the prospecting operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and bulk samples and pits /dumps will alter the topography by adding features to the landscape. Removal of alluvial gravels will unearth the current topography. The construction of infrastructure and various facilities in the prospecting area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and making prospecting pits or trenches, and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper

placement of infrastructure. Most of the site has a land capability for grazing, with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be affected, if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Prospecting activities on the area will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and prospecting activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

During the operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be Low. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

viii) The possible mitigation measures that could be applied and the level of risk

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered)

Geology and mineral resource

Level of risk: Very low

Mitigation measures

- Ensure that optimal use is made of the available mineral resource through proper planning.
- The prospecting of alluvial gravels should be well planned and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.
- No dumping of materials prior to approval by manager.

Topography

Level of risk: Low

Mitigation measures

- Prospecting of alluvial gravels continuously if possible, otherwise when they become available;
- Employ effective rehabilitation strategies to restore surface topography of and controlled backfilling at bulk sample sites, pits and plant site;
- Stabilise the mine residue deposit;
- All temporary infrastructures should be demolished during closure.

Soil erosion

Level of risk: Low-Medium

Mitigation measures

- At no point may plant cover be removed within the no-development zones;
- All attempts must be made to avoid exposure of dispersive soils;
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased;
- Ground exposure should be minimised in terms of the surface area and duration, wherever possible;
- The soil that is stockpiled during construction should be stock-piled in layers and protected by berms to prevent erosion;
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses;

- Stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate;
- Stockpiles susceptible to wind erosion are to be covered during windy periods;
- Audits must be carried out at regular intervals to identify areas where erosion is occurring;
- Appropriate remedial action, including the rehabilitation of eroded areas, must occur;
- Dust suppression should take place;
- Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion;
- Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions;
- Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired;
- Topsoil stockpiles must be kept separate from sub-soils;
- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil;
- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution;
- Spill kits to clean up accidental spills from earthmoving machinery must be well marked and available on site;
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures;
- All facilities where dangerous materials are stored must be contained in a bund wall;
- Vehicles and machinery should be regularly serviced and maintained.

Soil pollution

Level of risk: Low

Mitigation measures

- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.
- All facilities where dangerous materials are stored must be contained in a bund wall.
- Vehicles and machinery should be regularly serviced and maintained.

Land capability and land use

Level of risk: Low

Mitigation measures

- Ensure that optimal use is made of the available land through consultation with land owner and proper planning of prospecting activities.
- Employ effective rehabilitation strategies to restore land capability and land use potential of the prospecting area.
- All activities to be restricted within the demarcated areas.

Ground water**Level of risk:** Low**Mitigation measures**

- Training and awareness
 - Make all employees aware of water conservation/water demand management, water pollution avoidance and minimization measures reporting procedure and registry of incidents.
 - Train all employees to reduce water consumption.
 - Make one (1) individual person at a management level responsible for the management of the overall water balance. Train employees in the managing of water balance, water pollution and water conservation within their sectors.
 - Train all employees in the implementation of standard operating procedures (SOP's) (e.g. hydrocarbon management, sewerage plant management, monitoring and record keeping).
- Minimise and manage the loss in water resource
- Allow for a safe working environment

Surface water**Level of risk:** Low - Medium**Mitigation measures**

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- If servicing and washing of the vehicles occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.
- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent material and this material removed to an approved waste site.
- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The prospecting site should be cleaned daily and litter removed.

- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Only environmental friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources.
- Pipe leakages should be minimized.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non prospecting waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.
- The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.

Indigenous flora

Level of risk: Low to medium

Mitigation measures

- Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;
- It is recommended that these plants are identified and marked prior to prospecting
- These plants should where possible, be incorporated into the design layout and left in situ.
- However if threatened of destruction by prospecting these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- Minimise the footprint of transformation
- Encourage proper rehabilitation of prospecting areas
- Encourage the growth of natural plant species (diverse selection of natural plant species).
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.
- Ensure measures for the adherence to speed limit.
- Maintenance of firebreaks;
- No trees felled for firewood;

Alien invasive plants

Level of risk: Low to medium

Mitigation measures

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of prospecting areas.
- Encourage the growth of natural plant species.

- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.

Fauna

Level of risk: Low - Medium

Mitigation measures

- Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the prospecting site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors.
- Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.
- All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The environmental induction should occur in the appropriate languages for the workers who may require translation.
- Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to the speed limit.
- Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.
- The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;
- Snares & traps removed and destroyed; and

Habitat

Level of risk: Medium - High

Mitigation measures

- Prospecting activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.

- The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorised to do so.

Air quality

Level of risk: Low-Medium

Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for prospecting only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.
- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.
- The length of time where open areas are exposed should be restricted. Prospecting should not be delayed after vegetation has been cleared and topsoil removed.
- Dust suppression methods should, where logistically possible, must be implemented at all areas that may / are exposed for long periods of time.
- For all prospecting activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees:
 - Speed limits;
 - Spraying of surfaces with water;
 - Prospecting of alluvial gravels and rehabilitation of disturbed areas; and

Noise and vibration

Level of risk: Medium

Mitigation measures

- Machinery with low noise levels which complies with the manufacturer's specifications to be used.
- Construction activities to take place during daytime period only.
- Noise monitoring on a quarterly basis.
- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- Emergency generators to be placed in such a manner that it is away from any homestead area.
- Noise monitoring to be done along the prospecting footprint and noise sources within the mine boundary on a monthly basis after which the frequency can change to a quarterly basis.

- The siren when conveyor, hauling vehicles area reversing and/or any other mine vehicle to be replaced with a vibrating type siren if it is approved by the Mine Health and Safety Department.
- Haul roads to be levelled on a regular basis to avoid the formation of potholes.
- Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the baseline noise levels.
- Actively manage the process and noise and vibration impact assessment to determine compliance to the noise regulations and/or vibration standards. The levels to be evaluated in terms of the baseline noise levels.

Visual impacts

Level of risk: Low Medium

Mitigation measures

Mitigation measures may be considered in two categories:

Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and

Secondary measures designed to specifically address the remaining negative effects of the final development proposals:

- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the prospecting activities, by “blending” with the surrounding areas. Such measures will include rehabilitation of the disturbed areas, such as the bulk sampling sites and pits by re-vegetation of the area and using an aesthetically pleasing design for the proposed development.
- During the construction phase the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.
- Reduce the construction period through careful planning and productive implementation of resources.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter and disused construction materials are managed and removed regularly.
- Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way.
- Reduce and control construction dust emitting activities through the use of approved dust suppression techniques; and
- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting or restrict lighting to certain areas.

- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

Traffic and road safety

Level of risk: Low

Mitigation measures

- Implement measures that ensure the adherence to traffic rules.

Heritage and Paleontological resources

Level of risk: Low

Mitigation measures

- Should any further heritage or cultural resources be found, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist or palaeontologist and if any fossil finds is encountered an palaeontologist should be contacted to remove (refer to the fossil finds procedure attached to the palaeontologist report).

Socio-economic

Level of risk: Low-Medium

Mitigation measures

In order to ensure that negative impacts are minimised and positives are enhanced, the following is recommended:

- Implement the mitigation measures as proposed in this report.
- As job creation is one of the most pressing socio-economic needs in the local community, through the development of Mystic Pearl Mine should focus on SMME development and related local job creation, whilst considering the limitations of the available local skills.
- Mystic Pearl should assist their employees to find suitable housing in the towns surrounding the prospecting area to limit additional impacts on the provision of services and infrastructure by the SPM.
- Assistance in terms of skills development for those that would be employed during the start-up and construction phases of the project, as well as for permanent employees during the operational phase of the project would be necessary. Education is critical to sustain the socio-economic development of the community members living in the area. Continued support for training and capacity building thus remain important.
- Possible SMME links to the mine should be pursued to maximise local business benefits;
- The establishment of a management and monitoring committee to deal with increased social pressure on the local area, as well as increased pressure on the infrastructure and services provision is recommended. Such a committee should

not only consist of representatives of Paul, but all the mining companies operating in the area together with representatives from the Sol Plaatje Local Municipality.

- Mystic Pearl should communicate and present their involvement in the community (goodwill, social responsibility, capacity building programmes, skills development, general development support and so forth) to obtain community support.
- Ensuring continued contact and communication between Mystic Pearl, Sol Plaatje Local Municipality, and local community leaders, as well as nearby landowners is critical, especially during the start-up and construction phase, but should also continue for the life of mine.

Interested and affected parties

Level of risk: Low

Mitigation measures

- Maintain active communication with IAPs.
- Ensure transparent communication with IAPs at all times.
- IAPs must be kept up to date on any changes in the prospecting operation.
- A complaints management system should be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately.

ix) Motivation where no alternative sites were considered

No alternative location for the proposed prospecting operation was considered, as the alluvial gravels have been deposited in this area. There is therefore no other alternative with regard to the overall operation footprint.

x) Statement motivating the alternative development location within the overall site (Provide a statement motivating the final site layout that is proposed)

Not applicable. There is no alternative development location for the site as this is the area with the possible mineable resource.

h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity (Including (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures)

Not applicable. There is no alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).

i) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties)

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)....	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	SIGNIFICANCE IF NOT MITIGATED	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	SIGNIFICANCE IF MITIGATION
Processing Plant: 1 X 16 feet pan	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Medium	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing suitable mufflers on engine exhausts and compressor components; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.	Medium

<p>Ablution Facilities Chemical Toilets</p>	<p>Soil contamination Possible Groundwater contamination</p>	<p>Soil Groundwater</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Low</p>	<p>Maintenance of sewage facilities on a regular basis. Removal of container plants on closure</p>	<p>Very Low</p>
<p>Clean & Dirty water systems:</p>	<p>Surface disturbance Soil contamination Surface water contamination</p>	<p>Soil Surface Water</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Low</p>	<p>It will be necessary to divert storm water around bulk sampling sites and pits and dumps areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage areas. Bulk sample sites and pits for Alluvial gravel, where and when applicable, should be rehabilitated concurrently as prospecting progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipes will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>Low</p>

<p>Fuel facility (Diesel tanks)</p>	<p>Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance</p>	<p>Soil Groundwater Surface water</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Low</p>	<p>Maintain a buffer zone around the non-perennial streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.</p>	<p>Low</p>
<p>Prospecting Area.</p>	<p>Dust Noise</p>	<p>Air quality Fauna Flora</p>	<p>Commissioning Operational Decommissioning</p>	<p>Low - Medium</p>	<p>Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.</p>	<p>Low</p>

	<p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>	<p>Groundwater</p> <p>Noise and vibration</p> <p>Soil</p> <p>Surface Water</p> <p>Topography</p> <p>Safety</p>	<p>Closure</p>	<p>monitoring</p> <p>Continuous rehabilitation</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p> <p>Drip trays</p> <p>MRD stability control and monitoring</p> <p>Erosion control</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Installing silencers for fans;</p> <p>Installing suitable mufflers on engine exhausts and compressor components;</p> <p>Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone around the non-perennial streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.</p> <p>Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc.</p> <p>Effluents and waste should be recycling and re-use as far as possible.</p>	<p>The extent of the prospecting area</p>
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			<p>should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</p>	
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<p>Salvage yard and (Storage laydown area)</p>	<p>Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination</p>	<p>Fauna Flora Groundwater Soil Surface Water</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Medium-Low</p>	<p>Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to minimise the overall prospecting footprint. The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting; Snarcs & traps removed and destroyed; and</p>	<p>Low</p>
<p>Product Stockpile area</p>	<p>Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance</p>	<p>Air Quality Fauna Flora Noise Soil Surface Water</p>	<p>Commissioning Operational Decommissioning Closure</p>	<p>Medium</p>	<p>Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill</p> <p>Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound</p>	<p>Low</p>

<p>power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.</p>	<p>Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals</p>	<p>Low</p>	<p>power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.</p>	<p>Low</p>
<p>Waste disposal site (domestic and industrial waste):</p>	<p>Groundwater contamination Contamination of soil Surface water contamination</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Medium-Low</p>	<p>Medium-Low</p>
<p>Roads (both access and haulage road on the prospecting site):</p>	<p>Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Medium-Low</p>	<p>Medium-Low</p>

Temporary Workshop Facilities and Wash bay	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium-Low	Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Low
Water distribution Pipeline	Soil contamination Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Low
Water tanks: 1 X 10 000 litre water tanks and purifiers for potable water.	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintain water tanks and structures	Low

j) Summary of specialist reports

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p>Annexure B ECOLOGICAL SPECIALIST STUDY FOR THE PROPOSED MYSTIC PEARL 157 (PTY) LTD DIAMOND MINE PROJECT ON PORTION 1 OF FARM VOORUITZIGT 81 & CONCURRENT DEVELOPMENT OF OTTO'S KOPJE DIAMOND MINE, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE Beryl Wilson Zoologist & Conservation Biologist McGregor Museum</p>	<p>The proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt and the concurrent development of Otto's Kopje Diamond Mine in the Kimberley district is likely to have the following impacts on fauna locally and regionally. These are:</p> <ul style="list-style-type: none"> • Loss of terrestrial habitat – Impacts associated with this are LOW-MEDIUM as the area is already significantly disturbed. • Loss of ephemeral habitat – Impacts associated with this are LOW-MEDIUM as there are no significant water bodies present. • Disturbance and displacement of fauna – Impacts associated with this are LOW-MEDIUM as they are unavoidable but of a limited scale. • Faunal interactions with mining activities, servitudes and personnel – Impacts associated with this are MEDIUM as they will be ongoing and unavoidable. • Impact on surrounding habitat and species – Impacts associated with this are MEDIUM as they will be ongoing and unavoidable and extend to areas outside of the footprints of the mine e.g. transport routes. • Increase in environmental degradation – Impacts associated with this are LOW-MEDIUM as mitigation measures can be successful instituted. • Loss of Red Data / protected species – Impacts associated with this are LOW-MEDIUM as there are not considered to be sizable populations of Red Data or protected species present on the sites. • Introduction / spread of alien species – Impacts associated with this are LOW-MEDIUM as these can be contained with basic mitigation measures. • Loss of species diversity – Impacts associated with this are LOW-MEDIUM as the area is not believed to contain unique species or a high species diversity due to historical disturbances and nearby human settlements. <p>No biodiversity offset is required for this project. Impact Statement: The proposed Mystic Pearl 157 (Pty) Ltd diamond mine project on Portion 1 of Farm Vooruitzigt and the concurrent development of Otto's Kopje</p>	<p style="text-align: center;">X</p>	<p>i) Details of the development footprint alternatives considered</p> <p>e) Impact Management Outcomes (A description of impact management identifying the standard of impact management required for the aspects contemplated in paragraph())</p>

<p>Annexure C PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81, KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE Prepared by Edward Matenga (MPhil, Archaeology; PhD Archaeology & Heritage, Uppsala/Sweden) Friday, 26 May 2017</p>	<p>Diamond Mine in the Kimberley district, Northern Cape will have a low to moderate impact on local fauna which could be reduced to mostly low levels through appropriate mitigation. There will however be residual impacts which cannot be eliminated by the proposed mitigation and these will remain at a moderate level.</p>	<p>X</p>	<p>i) Details of development alternatives considered e) Impact Management Outcomes (A description of impact management identifying the standard of impact management required for the aspects contemplated in paragraph())</p>
<p>Annexure D PALAEONTOLOGICAL SPECIALIST ASSESSMENT (DESKTOP) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT NO 25/1999 FOR A PROSPECTING RIGHT ON A PORTION OF PORTION 1 OF THE FARM VOORUITZIGT 81,</p>	<p>The two mounds of household waste are not worthy of protection in terms of this impact evaluation. Apart from these, nothing on the property has been found to be archaeological or historically significant. The gives a green light for project go ahead. If heritage resources were to be found during the prospecting or mining phases, the procedure is to approach the relevant heritage authorities (SAHRA and/or the Provincial Heritage Resources Authority).</p> <p>Although the impact of the proposed development on fossil resources is expected to be minimal, it is still recommended that the Environmental Control Officer (Eco) put in place a contingency plan to rescue chance finds and where possible preserve them in situ. A standard Fossil Finds Procedure (FFP) is appended to this report to provide field guidance to the ECO. The recommendations made here should also be incorporated into the Environmental Management Plan for the proposed mining operations.</p>	<p>X</p>	<p>i) Details of development alternatives considered e) Impact Management Outcomes (A description of impact management identifying the standard of impact management required for the aspects contemplated in paragraph())</p>

<p>KIMBERLEY DISTRICT, NORTHERN CAPE PROVINCE Prepared by Joseph Chikumbirike (PhD) Palaeontology, University of the Witwatersrand) Friday, 26 May 2017</p>	<p>Annexure E FOSSIL FINDS PROCEDURE</p>	<p>X</p>	
<p>Annexure F Groundwater Assessment of Portion 1 of the Farm Vooruitzigt 81, Northern Cape Province. Report Prepared for Mystic Pearl by SRK Consulting, August 2017</p>	<p>The Fossil Finds Procedure (FFP) provides the developer with a framework for the conservation of fossil finds if they are present or have been unearthed during prospecting and the mining phase. This is to ensure compliance with Section 38 of the National Heritage Resources Act (Act No. 25 of 1999). The aim of the FFP is to reduce the risk of destruction of chance fossil finds during excavations and other earth-moving operations.</p> <p>A monitoring framework when excavations are in progress must be put in place implemented by the field supervisor. This may entail general training or awareness campaigns for workers to watch for potential fossil materials and report them immediately to their immediate supervisor.</p> <p>Based on the information discussed in this report, the following can be concluded regarding the groundwater conditions in the area of Portion of Portion 1 of the Farm Vooruitzigt 81 :</p> <ul style="list-style-type: none"> • The site is partially underlain by a dolerite sill and the central part is covered with windblown sand; • The dolerite sill is generally thin and underlain by Ecca mudstone, shale and sandstone. However, it forms an aquiclude above the Ecca aquifer below; • Average MAP for the site is approximately 460 mm/a and recharge varies from 7.8 mm/a in the north-west to 8.6 mm/a in the south-east; • The groundwater map indicates that the northern part of the site is underlain by a fractured-rock aquifer and the average maximum immediate yield of successful boreholes drilled in this region ranges between 0.5 – 2.0 L/s. The southern part of the site (where the processing plant and slimes dam are proposed) is underlain by a low yielding (0 – 0.1 L/s) intergranular and fractured-rock aquifer; • Lineament mapping indicates some lineaments in the area surrounding the site, but none of these intersect the site; • Six boreholes were surveyed in the area surrounding the site during the hydrocensus. The data indicates that groundwater from these is exclusively used for stock watering; • A Quaternary watershed occurs immediately south of the site, and 	<p>X</p>	

	<p>surface water flows from the site to the northwest; Groundwater levels in the area surrounding the site vary between 6.7 and 15.7 mbgl;</p> <ul style="list-style-type: none"> • Groundwater quality in the study area, based on field measured ECs, is generally poor with measured ECs ranging from 190 to 280 mS/m; • The proposed slimes dam and Boerevestnik plant are located in an area where groundwater vulnerability to surface pollution is medium, whilst the area to the north thereof is highly vulnerable to contamination from surface sources; • From a groundwater perspective, the proposed processing site is favourable with low impact potential, as long as possible groundwater contamination sources are kept away from lineaments; • The potential impact of the proposed processing plant on local groundwater sources can be reduced by implementing mitigation measures during all phases of the project; • A monitoring programme is essential to identify red flag situations, if any, timeously. 		
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Attach copies of the Specialist Reports as appendices (All studies attached as Annexures from A – F)

k) Environmental impact statement**(i) Summary of the key findings of the environmental impact assessment;**

- The Processing plant may have a medium impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Ablution facilities will have a low impact on groundwater and soil in case of an emergency spill after mitigation.
- The Clean & Dirty water systems may have a low impact on groundwater, soil and surface water after mitigation.
- The Fuel Storage facility (Diesel tanks) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Prospecting Area may have a medium impact on air quality fauna, flora, noise, soil, surface water and topography after mitigation.
- The Salvage yard (Storage and laydown area) may have a low impact on fauna, flora, groundwater, soil and surface water after mitigation.
- The waste disposal site (domestic and industrial waste) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Roads (both access and haulage road on the mine site) may have a low impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Workshop and Wash bay may have a low impact on groundwater, soil and surface water after mitigation.
- The Water distribution Pipeline may have a low impact on fauna, flora, and surface water after mitigation.
- The Water tanks may have a low impact on fauna, flora, and surface water after mitigation.

From the assessment of impacts throughout all the phases it is clear that though the impacts may occur directly as a result of the proposed start in prospecting operations, the impacts are mostly of medium significance before mitigation. According to the assessment carried out by the EAP the majority of the impacts can be reduced to a low significance with the appropriate mitigation measures in place.

The EAPs and environmental consultants responsible for the compilation of this document, and the associated PPP are of the opinion based on the presented specialist assessments and impact assessment that the Environmental Authorization application should be authorised.

The following mitigation measures are crucial and should form part of the environmental authorisation to ensure that the applicant manages impacts adequately:

- Adhere to the approved Environmental Management Programme
- Adhere to the Emergency procedures Report and implement spill clean-up procedures

- Apply for relevant permits with authorities for the removal of indigenous tree species and indigenous vegetation if applicable.
- Major spills should be reported within 24hr to the Department of Water and Sanitation and the NCDENC.

The nature of impacts can vary widely depending on the type of physical environment, the size of the activity and the perceptions and values of each of the affected parties. It was the objective of the assessment to identify both positive and negative impacts. The existing information was reviewed to assess the present status of the environment and the extent to which they have already been modified. The planned activities and associated infrastructure was used as reference to assess potential impacts.

In general, the environmental impacts associated to the prospecting operation are rather negative, while the social impacts are more beneficial. Impacts on vegetation are likely to be most profound, because the prospecting operation will constitute large-scale clearance of indigenous vegetation and most likely also the removal of protected species if any is encountered. Soil erosion and surface water deterioration are likely to be possible important impacts if appropriate management strategies are not practised.

Positive impacts include the demarcation and subsequent protection of possible heritage resources and the eradication of alien invasive species. Positive social impacts include the creation of jobs, social upliftment, training opportunities, community development and numerous economic benefits.

To conclude, it must be accepted that any activities will have both physical and social impacts. Therefore the destruction of the natural environmental features within the prospecting area is inevitable. The significance of the impacts will however be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area.

(ii) Final Site Map;

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Appendix (Figure 13)**

The final site map below indicates the prospecting right application area in which all prospecting will take place. Existing roads are also depicted. The associated infrastructure relating to the prospecting site is also indicated.

No prospecting operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, or any other structure whatsoever including such structures beyond the prospecting boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by risk assessment and all

restrictions and conditions determined in terms of the risk assessment are complied with;

Please see Final Site Map below.

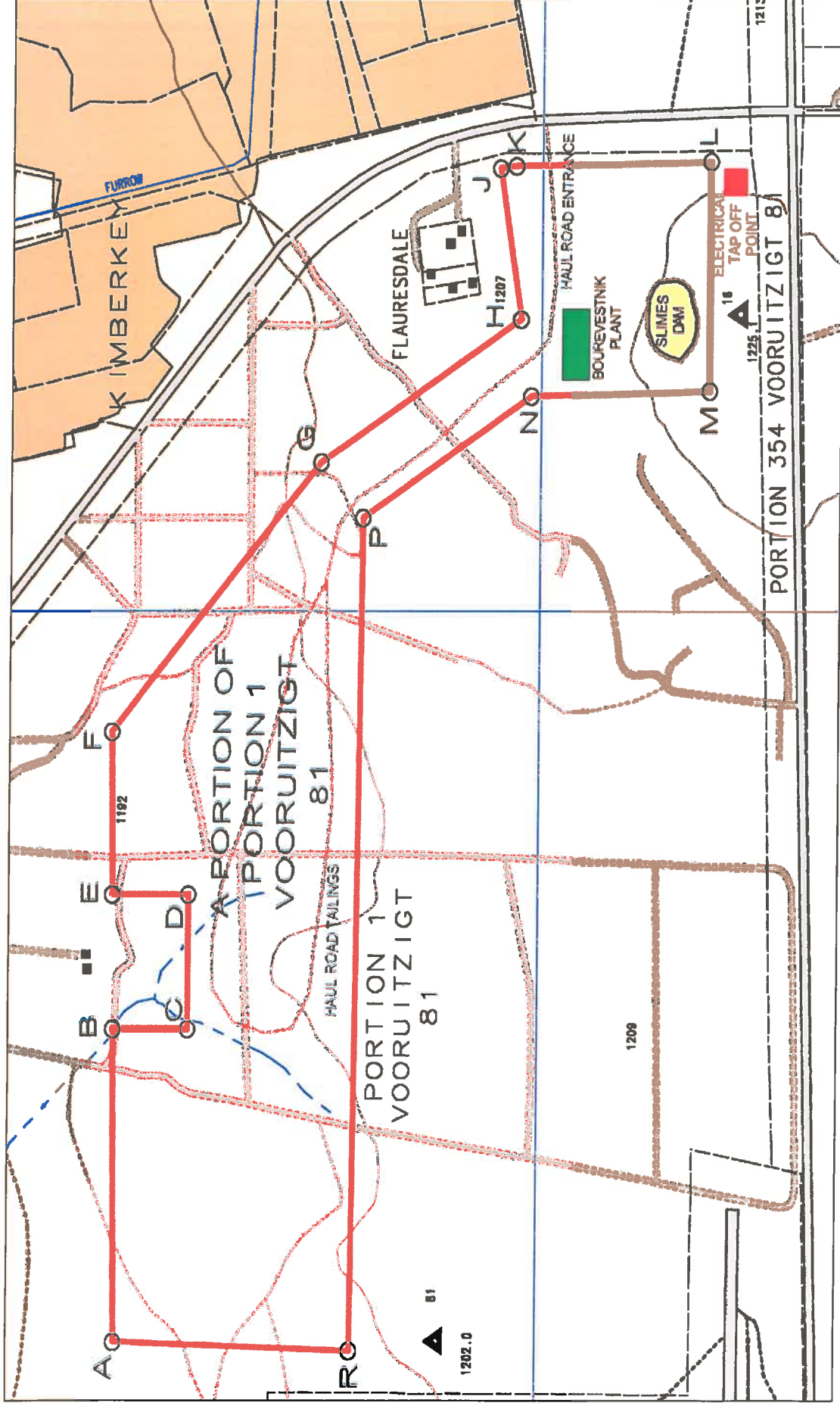


Figure 13: Final Site Surface layout map with sensitivity map on the right side.

(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

As mentioned before, the specific occurrence of diamonds in the area dictates the selection of the specific prospecting site and there are no alternatives in terms of project location.

In terms of alternative land use, the proposed Prospecting operation will be done in such a way that grazing will still be possible as the site will be rehabilitated in such a way that it allows the establishment of grass cover again.

The prospecting operation will provide 10 – 20 jobs depending on the phase of prospecting and will also add to the increased economic activity and the area surrounding the prospecting site.

Bulk sample trenches and pits, where and when applicable, should be rehabilitated concurrently as prospecting progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration.

During the operational stages of the prospecting operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. However the site layout plan has been developed not to place any infrastructure where resource materials could be located. The infrastructure and bulk sample sites and pits /dumps will alter the topography by adding features to the landscape. Topsoil removal and Mine Residue Dumps will change the natural topography. The construction of infrastructure and various facilities in the prospecting area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and prospecting of alluvial gravels, and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. Most of the site has a land capability for grazing, but grazing activities can still be performed in areas not earmarked for the operation, and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected if any oil and fuel spillages occur during these scenarios and activities, and then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any dumping within the drainage lines will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation.

Prospecting activities on site will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and prospecting activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

The transformation of natural habitats to prospecting and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to operational activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates.

During the operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-

influenced sounds such as traffic on the secondary road, activities on the farming areas and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be Low. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon possible heritage resources. The phase 1 studies have indicated no Heritage sites or Paleontological sites.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and operation-related businesses.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

In terms of the Social Impact Assessment findings derived from the information available at this stage it is concluded that the likely benefits of the proposed project outweigh the potential social risks and/or threats to the local communities. However, as indicated earlier in the report, the possible impact on the infrastructure and service needs due to the inflow of an additional workforce should be addressed. It would remain the responsibility of the Local Municipality, but considering the social framework within which the mine operates, it is important for the mine to engage with the SPM in this regard to minimise any possible negative impacts. Such engagement should also contribute to meaningful contributions to the communities situated in close proximity to the mine.

It is furthermore important to ensure that any negative impacts as a result of the prospecting activities on the residents should be limited.

The prospecting activities and associated infrastructure by itself will thus not introduce new social risks and hazards, but only increase the probability and scale of those already associated with the existing prospecting activities

On a more detailed level, the following **positive** impacts are anticipated:

- The creation of job opportunities in the area, and associated local economic development;
- Economic and revenue contribution to the local municipal area, as well as the Sol Plaatje District and adjacent municipalities;
- The involvement of Mystic Pearl with regards to training and capacity building of his employees and subsequent improvement of the livelihoods of the employees' families, as well as its efforts in sustaining the socio-economic development of the communities in close proximity to the operation;
- The involvement of Mystic Pearl with regards to social development projects and support through the Integrated Development Plans (IDPs);
- The positive impact of prospecting activity on the regional and local economy; and
- Positive impact of extensive local procurement focus.

Negative impacts as a result of the prospecting activity refer to:

- Inconvenience and intrusion impacts during the start-up and construction phases of the project such as the inflow of an additional workforce to the area, the possible influx of jobseekers, possible increase in the criminal activities (safety and security issues), disruption of social networks, as well as possible health risks;
- Disruptions in the daily living and movement patterns (increased traffic and possible dust pollution);
- Additional pressure on infrastructure development and maintenance;
- General intrusion impacts such as visual and noise pollution

From a social perspective it can be concluded that the proposed Mystic Pearl Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR are adhered to e.g. ongoing environmental management and rehabilitation once the mine reaches its end of life.

I) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as conditions of authorisation.

Air Quality

- To limit the creation of nuisance dust the following management guidelines must be followed:
- Avoidance of unnecessary removal of vegetation.
- Routine spraying of unpaved site areas and roads utilized by the prospecting operation with water.
- Speed limits of vehicles inside the prospecting area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous dumping and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.

Archaeology:

- All operators of equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered:
 - All construction in the immediate vicinity (50m radius of the site) should cease.
 - The heritage practitioner should be informed as soon as possible.
 - In the event of obvious human remains the SAPS should be notified.
 - Mitigation measures (such as refilling) should not be attempted.
 - The area in a 50m radius of the find should be cordoned off with hazard tape.
 - Public access should be limited.
 - No media statement should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.
 - Paleontological finds should be handled as per the fossil finds procedure.

Fauna

- To ensure a minimum of impact to animals the following management guidelines will be followed:
 - **Preconstruction and construction phases**
 - The preconstruction phase usually involves the removal of topsoil and vegetation as well as the establishment of related infrastructure needed for the mining activities. Unfortunately, the impacts resulting from this phase are difficult to mitigate. However, the impacts are likely to be localised and not widespread. It may be possible to save a significant proportion of animals. Furthermore, the negative effects of this phase can be partially mitigated by:
 - Keeping the areas of disturbance to a minimum
 - Reducing the amount of soils to be removed from sites

- Staying clear of the drainage areas and sensitive areas and maintaining an appropriate buffer zone (at least 30 m) between these areas and the erected structures
- Construction of culverts, where necessary, to allow for water flow along drainage lines and suitable erosion barriers
- Not disturbing the movements of any animals intending to flee the impacted area by preventing abuse and hunting/chasing of animals by workers and by allowing them passage if they are seen wanting to disperse. This prevents the need for costly trapping and relocation exercises
- Monitoring dust pollution if necessary, and applying reasonable and applicable dust-suppression measures
- Avoiding initial mining activities during spring/summer as animals reproduce and disperse during this period
- Ground water abstraction should be monitored and kept to a minimum
- Raptor-proofing all open water bodies to allow birds to drink and bathe, preventing drowning, and thus contributing to raptor conservation. This can be done by:
 - Keeping reservoirs full
 - Covering reservoirs with shade cloth
 - Attaching a wooden plank, log, ladder or branch to the wall of the reservoir onto which a drowning bird can grasp and lift itself out of the water. These structures can also serve as a platform from which raptors and other birds can drink. However, wooden structures may need to be replaced every few years
- Providing alternative, more natural drinking places on the ground
- Bird-unsafe electrical structures must be modified to insulate dangerous live components, and to cut a gap in the earth wire – perch deterrents can also be installed to keep birds away from the dangerous areas on the structure.
- Bird collisions on newly constructed electrical features must have anti-collision devices in place
- Soil and water contamination from diesel spills, particularly at the storage tanks, must be prevented by ensuring these areas are adequately constructed on barrier foundations
- Maintaining the integrity of the natural habitat around the facilities, thereby providing the possibility for animals to flee the affected area and re-settle in the undisturbed areas around the area
- Prohibiting the intentional killing of animals through on-site supervision and worksite rules
- Educating employees to minimise accidental killings of animals during the pre-construction phase
- Relocating slow-moving animals like Tortoises, found during ground-breaking to nearby suitable, undisturbed areas
- Where necessary and feasible, the construction of landscaped culverts to a depth of 300 mm to allow free movement for small mammals, reptiles and amphibians under roads or other barriers. These will need to be maintained throughout the operational phase and beyond

- Where necessary and feasible, the construction of berms, low walling or fencing guiding animals towards these culverts, thus promoting the use of these passage ways
- Dangerous interactions between personnel and venomous fauna can be reduced through awareness courses, posters, and other forms of education
- The importation of unsterilised and unvaccinated domestic animals, in particular cats, on to site must be banned
- The establishment of a veld fire action policy in the event of a veld fire to prevent unnecessary loss of fauna and habitat.

Mitigation is therefore aimed at preventing the destruction and killing of the animal life in the area, and the maintenance of suitable habitat and resources where possible.

Operational phase

This phase will primarily affect mobile fauna. These impacts are likely to be more extensive and of longer duration. Most of the impact will occur during the actual mining operations; however, the following steps are required during the operational phase to avoid further negative impact on fauna and the environment:

- The establishment of a basic monitoring programme which considers the key suggestions and concerns of all project specialists, and the familiarisation of terrain staff with these issues so that the area and associated ecosystems can be monitored for significant negative changes and immediate actions taken to rectify these changes
- Preventing any further harassment of animals that remain within the project area and enforcement of disciplinary actions on transgressors
- If constructed, regular assessment of the effectiveness and maintenance of culverts to allow movement of animals and water
- Ensuring dust suppression measures are maintained
- Regular inspection of diesel storage facilities and the implementation of a clean-up operation in the event of an accidental spill
- The continuance of a veld fire action policy in the event of a veld fire resulting from project activities and personal, or from natural causes to prevent unnecessary loss of fauna and habitat
- Interactions between personnel and venomous fauna can be reduced if the presence of humans does not provide food and refuge opportunities for these animals. Rubble, compost heaps, domestic chickens etc are all tremendous attractants to snakes should be avoided
- The training of employees to reduce littering
- A regular refuge removal regime to discourage baboon-raiding activities
- The maintenance of a “no domestic animal” policy.

Mitigation in this phase is aimed at preventing the destruction and killing of the remaining animal life in the area, and the maintenance of the remaining habitat and resources.

Flora

- No trees or shrubs must be felled or damaged for the purpose of obtaining firewood.
- Management must take responsibility to control declared invader or exotic species on the site. The following control methods must be used:
 - 'The plants will be uprooted, felled or cut off and can be destroyed completely.'
 - The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.
- Valid permits from DAFF must be obtained before any protected plant species are removed or damaged if encountered.
- Continuous controlled dumping and spreading of previously stored topsoil over the rehabilitated areas.
- All rehabilitated areas, where applicable and possible must be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to prospecting activities commenced if the natural succession of vegetation is unacceptably slow.
- Fires may only be allowed in facilities or equipment specially constructed for this purpose.
- The end objective of the re-vegetation program must be to achieve a stable self-sustaining habitat unit.

Groundwater

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside a bulk sample excavation and outside of the maintenance area.
 - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.
 - All efforts must be made to move the broken down vehicle or piece of equipment to the maintenance area.
 - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
- No repairs may be allowed outside the maintenance area except for emergencies.
- Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
- Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).
- Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
- Acceptable hygienic and aesthetic practices must be adhered to.

- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- SOP for storage, handling and transport of different hazardous materials.
- Place oil traps (drip trays) under stationary vehicles, only re-fuel at fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
- Ensure good housekeeping rules.

Noise

- Working hours must be kept between sunrise and sunset as far as possible.
- As a minimum, ambient noise levels emanating from the prospecting activities may not exceed 82dBA at the site boundary.
- The Applicant must comply with the Occupational Noise Regulations of the Occupational Health and Safety Act, Act 85 of 1993.
- The Applicant must comply with the measures for good practice with regard to management of noise related impacts during construction and operation.
- The management objective must be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant area and that which may migrate outside the plant area.
- When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or work exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.
- Hearing protection must be provided to all employees where attenuation cannot be implemented.
- If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.

Mechanical equipment

- All mechanical equipment must be in good working order and vehicles must adhere to the relevant noise requirements of the Road Traffic Act.
- All vehicles in operation must be equipped with a silencer on its exhaust system.
- Safety measures, which generate noise such as reverse gear alarms on large vehicles, must be appropriately calibrated / adjusted.

Screening / Migration Control:

- Appropriate measures must be specifically being installed and / or employed at the plant to act as screen and to reflect/reduce the noise.
- Appropriate non-metallic washers/insulation must be used with any joining of apparatus made from materials such as corrugated iron. Such apparatus must be maintained in a fixed position.

Safety

- No employees may reside on the prospecting site.
- Access and haul roads must be maintained.
- Security access point to ensure monitoring of access to the site.

Soil

- In all places of development the first 300mm of loose or weathered material found will be classified as a growth medium. The topsoil must be removed where possible, from all areas where physical disturbance of the surface will occur.
- In all areas where the above growth medium will be impacted on, it must be removed and stockpiled on a dedicated area. The maximum height of stockpiles may not exceed 2 meters.
- The growth medium/topsoil must be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability.
- If any soil is contaminated during the life of the prospecting area, it must either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company.
- Erosion control in the form of re-vegetation and contouring of slopes must be implemented on disturbed areas in and around the site.
- Topsoil must be kept separate from overburden and may not be used for building or maintenance of access roads.
- The stored topsoil must be adequately protected from being blown away or being eroded.
- Compacted areas must be ripped to a depth of 300mm, where possible, during the continuous rehabilitation, decommissioning and closure phases of the operation in order to establish a growth medium for vegetation.
- Vehicle movement must be confined to establish roads for as far as practical in order to prevent the compaction of soils.

Surface water

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.
- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.
- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- An application for an integrated Water Use Licence must be submitted at the Department of Water Affairs for all actions to be performed which requires authorization in terms of water uses.

- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open bulk sample sites must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.
- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.

Topography

- All alluvial gravel bulk sampling sites and pits must be rehabilitated if and when possible and made safe so as to reflect as far as possible the pre-prospecting topography of the area.
- All temporary features e.g. plant, containers and stockpiling must be removed and handled in the prescribed manner during rehabilitation.

Visual

- Security Lights must be fixed at an angle to ensure that it does not cause a disturbance to the surrounding environment at night
- Alluvial bulk sampling sites and pits must be subject to progressive backfilling and made safe (including the re-establishment of vegetation).
- Permanent structures or features that are part of the proposed prospecting operation must be kept neat and well presented.
- Waste material of any description must be removed from the prospecting area on a regular basis and be disposed of at a recognized landfill facility.

The impact management objectives for the Mystic Pearl planned prospecting operation should include:

- To ensure efficient extraction of the diamonds and to prevent the sterilization of any diamond reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- Rehabilitation of disturbed areas during the mine life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of wetlands.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.

- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
 - To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.
 - To minimise noise and vibration to a level that disturbances felt by the communities are limited.
 - To reduce the impact on visual quality due to intrusive mine infrastructure, activities and facilities.
 - To ensure that all traffic generated by the proposed prospecting development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
 - To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
 - To ensure that the current socio-economic status quo is improved.
 - To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

m) Final proposed alternatives

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

The location of the central prospecting site and associated infrastructure is primarily based on proximity to the access roads, proximity to the areas earmarked for prospecting and limited additional impact on the environment.

It will therefore cause additional impacts if this infrastructure is moved and render the consideration of alternative prospecting sites useless.

The prospecting activities and methodologies associated with prospecting of alluvial diamonds is the only economic viable method currently being used by the diamonds fraternity. There is no alternative prospecting method for the prospecting of alluvial diamonds.

n) Aspects for inclusion as conditions of Authorisation

Any aspects which have not formed part of the EMP that must be made conditions of the Environmental Authorisation

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

o) Description of any assumptions, uncertainties and gaps in knowledge
(Which relate to the assessment and mitigation measure proposed)

The above mitigation measures are tried and tested over many years in the diamond mining/prospecting industry. The Applicant must monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

The EAP who compiled this document and the specialists who compiled the respective specialist reports have extensive knowledge in their field and it is therefore assumed that the above assumptions are adequate and that the information provided is correct.

p) Reasoned opinion as to whether the proposed activity should or should not be authorised

i) Reasons why the activity should be authorized or not.

There are no significant reasons why the activity should not be authorised. However, if the proposed management and mitigation measures are not properly applied or if the prospecting operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the competent authority should take all the necessary steps to ensure that the prospecting operation complies with the conditions set out in the approval of the EMPR.

ii) Conditions that must be included in the authorisation.

(1) Specific conditions to be included into the compilation and approval of EMPr

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

(2) Rehabilitation requirements

A Detailed rehabilitation plan will be appended to the EMPr. The Mine had to provide to the DMR, a financial rehabilitation guarantee to the amount as calculated in terms of the financial quantum Guideline and approved by the DMR.

Infrastructure areas

On completion of the prospecting operation, the various surfaces, including the access road, the office area, storage areas and the plant site, will finally be rehabilitated as follows: All other material on the surface will be removed to the original topsoil level where possible. This material will then be backfilled into any open pits or bulk sampling sites. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

All infrastructures, equipment, plant, and other items used during the operational period will be removed from the site.

On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

Topsoil and Stockpile Deposits:

Disposal Facilities: Waste material of all description inclusive of receptacles, scrap, rubble and tyres should be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It should not be permitted to be buried or burned on the site.

Ongoing Seepage, Control of Rain Water:

Water Quality Management in accordance with the South African Water Quality Guidelines must be adhered to in order to provide timely and accurate water data to the Department of Water and Sanitation (DWS) as well as to manage impacts caused by the activity. Specific objectives of such a program are to:

- Determine whether water quality comply with water quality standards.
- Provide timely data for intervention as and when required.
- Assess the status of water quality in the surrounding areas.
- Provide analytical water quality information describing trends (present conditions and changes).

The objectives are to limit the adverse effect of pollutants in the water resource. The setting of in-stream Resource Water Quality Objectives (RWQO) is based on the South African Water Quality Guidelines.

Water Monitoring Points

Surface water: The immediately adjacent areas 9 km to the north (Platfontein Pan) and 7 km northeast (Kamfers Dam) have significant water features that are fed by water runoff from this area as well as Kimberley waste water respectively some distance away from the prospecting right application. Monitoring takes place by collecting surface water samples every quarter.

Long Term Stability and Safety: It should be the objective of mine management to ensure the long term stability of all rehabilitated areas including the backfilled bulk sampling sites and pits. This should be done by the monitoring of all areas until a closure certificate has been issued.

Final rehabilitation in respect of erosion and dust control: Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is deemed necessary, unless vegetation growth is not returned to a desirable state by the time of mine closure.

Final Rehabilitation Roads:

- After rehabilitation has been completed, all roads should be ripped or ploughed, fertilized and providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

Submission of Information:

- Reports on rehabilitation and monitoring should be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55.

Maintenance (Aftercare):

- Maintenance after closure should include the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine should be to create an acceptable post-mine environment and land-use. Therefore all agreed commitments should be implemented by Mine Management.

After-effects Following Closure:

Acid Mine Drainage: No potential for bad quality leachate or acid mine drainage development is associated with diamond mine closure.

Long Term Impact on Ground Water: No after effect on the groundwater yield or quality is expected.

Long-term Stability of Rehabilitated Land: One of the main aims of any rehabilitated ground should be to obtain a self-sustaining and stable end result. The concurrent monitoring of all material and replacement of topsoil where available should be ensured.

q) Period for which the Environmental Authorisation is required

5 years. Thus the period required is for the Life of Mine of the Prospecting Right. Prospecting Right application for 3 years but can be renewed.

r) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation

i) Explain how the aforesaid amount was derived

The total cost to rehabilitate and mitigate the Mystic Pearl site as it stands currently (risking premature rehabilitation) is estimated to be R1 128 488 according to the DMR calculations.

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0.46	12.21	1	1	5.4945
2 (A)	Demolition of steel buildings and structures	m2		170.13	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	150	250.72	1	1	37608
3	Rehabilitation of access roads	m2	15000	30.44	1	1	456600
4 (A)	Demolition and rehabilitation of electrified railway lines	m		295.49	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m		161.18	1	1	0
5	Demolition of housing and/or administration facilities	m2	0.075	340.26	1	1	25.5195
6	Open cast rehabilitation including final voids and ramps	ha	0.5	173174.97	0.52	1	45025.4922
7	Sealing of shafts adits and inclines	m3		91.33	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0.04	118912.29	1	1	4756.4916
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	1	148103.1	1	1	148103.1
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha		430161.62	1	1	0
9	Rehabilitation of subsided areas	ha		99571.13	1	1	0
10	General surface rehabilitation	ha	1	94198.59	1	1	94198.59
11	River diversions	ha		94198.59	1	1	0
12	Fencing	m		107.45	1	1	0
13	Water management	ha		35816.95	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	2	12535.93	1	1	25071.86
15 (A)	Specialist study	Sum				1	0
15 (B)	Specialist study	Sum				1	0
Sub Total 1							811394.5478
1	Preliminary and General		97367.34574	weighting factor 2 1			97367.34574
2	Contingencies			81139.45478			81139.45478
Subtotal 2							989901.35
VAT (14%)							138586.19
Grand Total							1128488

- ii) **Confirm that this amount can be provided from operating expenditure**
(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining Work Programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be)

It is confirmed that the amount for outstanding rehabilitation can be provided from operating expenditure.

t) **Deviations from the approved scoping report and plan of study**

- i) **Deviations from the methodology used in determining the significance of potential environmental impacts and risks**

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation)

Not applicable – No deviations from the methodology proposed in the Scoping Report.

- ii) **Motivation for the deviation**

Not applicable – No deviations from the methodology proposed in the Scoping Report.

u) **Other information required by the competent Authority**

- i) **Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA Report must include the:-**

- (1) **Impact on the socio-economic conditions of any directly affected person** (Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 therein)

From a social perspective the following objectives and measures should be included as part of the Social Management Plan (SMP) as part of the Environmental Management Plan (EMP).

It should be noted that the responsibility of the mitigation lies with the owner, operator, and/or with the local municipality. The mitigation measures would have to form part of the respective stakeholder's expenditure predictions or operations and management within the area, therefore the monitoring activities cannot be expressed in financial terms.

From a social perspective it can be concluded that the proposed Mystic Pearl Project would not result in permanent damaging social impacts. The socio-

economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

- (2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act** (Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

Mr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa (Pty) Ltd has been appointed by Mystic Pearl to provide an Heritage Impact Assessment **Annexure C** in order to highlight the Heritage of the proposed prospecting area, and to determine the possible impact of prospecting on the Heritage of the application area.

Findings of the survey

A western portion of the property bears scars of excavations of varying depths which are ongoing in some areas. From an archaeological standpoint, the area is considered as disturbed and no archaeological provenances pre-dating the city can be expected to have survived the impact of these activities. Furthermore there are no elements of heritage value relating to the development of the city.

With respect to the eastern portion of the property close to the intersection of the N8 and R31, and located opposite to a section of Galeshewe Township, no archaeological relics were found. The only sign of human activity is degraded vegetation and pedestrian pathways to the farms and dumping site located to the west and northwest of the property.

Two mounds (Sites P9 & P10) which form the eastern ends of parallel ridges appear to be a mixture of household refuse and/or industrial discard perhaps dating back more than 60 years. Although the rating for heritage value is low, material / artefacts found therein might be of relevance in the fields of historical archaeology / industrial archaeology. However these two disciplines have not yet been formally introduced in universities or heritage museums in the country. The mounds therefore do not warrant protection in terms of this impact evaluation, suffice it to mention an opportunity that can be pursued in the future.

Palaentological

Mr. Joseph Chikumbirike from (AHSA) Archaeological and Heritage Services Africa (Pty) Ltd has been appointed by Mystic Pearl to provide an

Palaeontological Assessment **Annexure D** in order to highlight the Palaeontological features of the proposed prospecting area, and to determine the possible impact of prospecting on the Palaeontology of the application area.

This desktop palaeontological impact assessment (PIA) has been conducted in support of an application by Mystical Pearl (Pty Ltd) Northern Cape Province for a prospecting right on a Portion of Portion 1 of the Farm Vooruitzicht 81, Kimberley District, in the Northern Cape Province.

The proposed activity entails excavating 50 test trenches. It is estimated that an average 3m depth of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2 – 4m) which is host to the diamonds. The trenches will be 25m x 15m x 0.5 – 7m deep. A palaeontological assessment is necessary as these superficial levels might contain fossils in view of the known palaeontological sensitivity of the area.

The rock units underlying the area of the proposed development have been identified from the 1: 250 000 geology map 2824 Kimberley (Council for Geosciences, Pretoria), scientific literature and previous palaeontological impact assessments that have been conducted in the broader area. The following is a summary of the findings:

The Allanridge Formation andesite lavas belong to the Ventersdorp Supergroup (VSG) which date back to the Precambrian 2600 MYA. The Ventersdorp Supergroup represents a major episode of igneous extrusion, what is termed a Large Igneous Province (LIP) from below the Kaapvaal Craton some 2.7 Ga (billion years) ago. The Allanridge Formation of igneous lavas are considered to be unfossiliferous.

The Dwyka Group forms the lowermost and oldest deposit in the Karoo Supergroup basin. Northwest of Kimberley the rocks in this group exhibit glacial pavements - glacially-striated and eroded bedrocks – of Permian-Carboniferous age, (c. 300 Ma) that tend to overlie the Allanridge Formation outcrop area in the same region. The Dwyka tillite is mostly a very fine-grained, blue-grey rock comprised of clay / mud matrix with inclusions (or clasts) of many other fragments picked up by glaciers during their travels. The palaeontological rating of the glacial tillites of the Dwyka Group are considered to be medium to low.

The Eccu group is a subcomponent of the Karoo Supergroup, a sedimentary complex post-dating Dwyka in which principally shales and sandstones were laid down in the sandy shorelines of swamplands during the Permian Period. The Eccu fossil marine deposition may contain marine invertebrates (esp. molluscs, brachiopods), coprolites, palaeoniscoid fish & sharks. There are also traces fossils, various microfossils, petrified wood. The palaeontological rating according to Almond (2012) is high.

The Karoo dolerite of the Drakensberg Group sill underlies most of the area in the Kimberley municipal area. It represents an intrusion of igneous lavas

between 183.0 to 182.3 MYA. Dwyka shales lying immediately below the dolerite sheet have usually been metamorphosed to lydianite and homstone as a result of exposure to intense heat during the intrusion event, with a possibility of destroying fossil materials in the upper layers of these sediments. The Karoo dolerite (igneous lavas) are considered to be unfossiliferous.

Large areas of unconsolidated, reddish-brown to grey aeolian (i.e. wind-blown) sands of the Quaternary Gordonia Formation (Kalahari Group) have been observed on the western outskirts of Kimberley and at the Farm Vooruitzigt 81 and Fieldsview north of the city. Immediately below the sands may be a calcretic layer or pedogenic limestones generally considered of the same geological period. They are considered of low sensitivity with the possibility of finding calcretised rhizoliths & termitaria, ostrich egg shells, land snail shells, rare mammalian and reptile (e.g. tortoise) bones, teeth freshwater units associated with diatoms, molluscs, stromatolites etc.

Although the impact of the proposed development on fossil resources is expected to be minimal, it is still recommended that the Environmental Control Officer (Eco) put in place a contingency plan to rescue chance finds and where possible preserve them in situ. A standard Fossil Finds Procedure (FFP) is appended to this report to provide field guidance to the ECO. The recommendations made here should also be incorporated into the Environmental Management Plan for the proposed mining operations. (Palaentological Assessment by Joseph Chikumbirike (PhD Palaeontology, University of the Witwatersrand).

v) Other matters required in terms of sections 24(4)(a) and (b) of the Act

(the EAP managing the application, must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4**)

There are no alternatives, as the application area applied for is the area where the applicant has proven diamonds and has found potential for a diamond prospecting operation.